

Faculty of Education

The Relationship Between Attention - Deficit /  
Hyperactivity Disorder and Perceived Locus of Control in  
Boys

Mark Bivens

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Though much is taken much abides; and though  
We are not now that strength which in old days  
Moved earth and Heaven, that which we are, we are,  
One equal temper of heroic hearts,  
Made weak by time and fate, but strong in will  
To strive, to seek, to find, and not to yield.

*Ulysses*

Alfred, Lord Tennyson 1842

# Abstract

The research examines the relationship between the two variables Attention-Deficit/Hyperactivity Disorder (A-D/HD) and Locus of Control in boys identified with A-D/HD.

The major issues addressed are: the extent to which attentional deficit predicts external Locus of Control and the effect of a cognitive-behavioural intervention on boys with A-D/HD and a highly externalised Locus of Control. Reducing the externality of Locus of Control is seen as an innovative means of addressing some behavioural aspects of A-D/HD.

The study involved 77 A-D/HD boys with A-D/HD and 23 boys who were not A-D/HD, but who demonstrated similar levels of disruptive behaviours, from schools in Western Australia. Australian norms were established for the Locus of Control instrument (CNS-IE) using 300 male classmates of the participants.

Each boy was assessed by parents and teachers on established measures of A-D/HD (the Child Behavior Checklist (CBCL) and the Attention Deficit Disorders Evaluation Scale (ADDES)). The boys completed the CNS-IE both before and after the intervention. The boys with A-D/HD were medicated with Dexamphetamine or Ritalin, as prescribed by appropriate medical practitioner.

The association of A-D/HD diagnostic subtypes, (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Combined Type*)

with Locus of Control was also investigated.

The results demonstrate that a significant ( $p < 0.001$ ) correlation exists between attention deficit (assessed by the two parallel measures, CBCL and ADDES) and Locus of Control. The Locus of Control of boys with A-D/HD was significantly ( $p < 0.001$ ) more external than that of the non-A-D/HD boys. This finding held true for each of the three A-D/HD subtypes when they were compared to the non-A-D/HD group.

Participation in the cognitive behavioural intervention (the *Stop, Think, Do* program) significantly ( $p < 0.001$ ) reduced the level of externality of Locus of Control in all groups of subjects.

The research also examined the relationship between parents and teachers ratings of the same individual's behaviour. Ratings were found to be highly consistent between both groups. Parent ratings of inattention appear to be particularly salient both in identifying boys with an associated external Locus of Control and as an indicator of A-D/HD.

The results of the research support the use of appropriate cognitive - behavioural interventions in addressing self-regulation and responsibility, the central issues put forward in the *Behavioural Disinhibition model* of A-D/HD.

Implications for the management of A-D/HD in the long term are also addressed. A multi-modal model involving medication and two stages of cognitive-behavioural intervention is recommended, where a cognitive - behavioural intervention is used initially to develop a more internal Locus of Control, this being followed by a reframing program to sustain and develop more adaptive perceptions and behaviours.

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# **Chapter 1**

## **Introduction**

The central hypothesis of this thesis is that behaviours which are symptomatic of Attention-Deficit/Hyperactivity Disorder (A-D/HD) reflect an externalizing perceived Locus of Control and that participation in an appropriate intervention program can reduce the level of externality of perceived Locus of Control. This will directly affect the development of self-regulation and responsibility in individuals diagnosed with A-D/HD.

The research reported in this thesis represents an original examination of the ability of individuals with A-D/HD to shift their perceived Locus of Control in the direction of greater internalization. It examines the proposition that an appropriate cognitive behavioural intervention can be employed with A-D/HD individuals to effect change in their perceived Locus of Control. If this hypothesis is supported then it will have implications for how teachers, school psychologists, parents and physicians deal with children who have been diagnosed with A-D/HD, or who otherwise have deficits in attention.

The three Research Objectives of this thesis are:

1. *To investigate the relationship between perceived Locus of Control and attentional deficiency, with greater externality hypothesized to be associated with greater deficits in attention.*
2. *To explore whether perceived Locus of Control differentiates between boys diagnosed with clinical levels of A-D/HD and their classroom peers with normal attentional capacities.*
3. *To determine whether a Cognitive – Behavioural Intervention significantly reduces the externality of perceived Locus of Control in boys with A-D/HD.*

## **Social Learning and Locus of Control**

In order for learning to occur the individual must be aware, at some level, that the reinforcement of their actions is related causally to their behaviour. When this awareness exists, actions that receive reinforcement are repeated and we say that learning has occurred. Conversely, when actions are followed by aversive reinforcement, the action is decreased and learning has again occurred.

Furthermore, individuals need not experience reinforcement directly for learning to occur. Vicarious learning occurs frequently through our observations of what befalls other people. The crucial factor is awareness of the causal link between behaviour and its consequences:

People cannot learn much by observation unless they attend to, and accurately perceive, the relevant aspects of modeled activities. Attentional processes determine what is selectively observed in the profusion of modelling influences and what information is extracted from ongoing modeled events. Selective attention is, therefore, one of the crucial subfunctions in observational learning.

(Bandura, 1986, p. 51)

This capacity to engage in selective attention is taken for granted until we encounter individuals who have only a limited capacity to attend selectively to stimuli. This is particularly the case for children, adolescents and adults diagnosed with the condition Attention-Deficit/Hyperactivity Disorder (A-D/HD), which is now recognised in the International Classification of Disease by the World Health Organisation (ICD-10, World Health Organisation, 1992).

The disorder which is currently termed A-D/HD has undergone a number of changes of name and terminology since it was originally described. Throughout this thesis the abbreviation A-D/HD will be used as a general rule. Exceptions will be made when necessary to illustrate or clarify points from the historical perspective. A-D/HD has been characterised in the research literature as a behavioural syndrome in which symptoms of hyperactivity and/or inattention cause impairment in social, academic or occupational functioning (NHMRC, 1997, p. 1).

The significant incidence of this disorder in Western Australia has been acknowledged by reports of the National Health and Medical Research Council (NHMRC) (1997) and the Western Australian Child Health Survey (Zubrick, Silburn, Garton, Burton, Dalby, Carlton, Shepherd & Lawrence, 1995; Zubrick, Silburn, Gurrin, Teoh, Shepherd, Carlton & Lawrence, 1997). These reports estimate that between 1% and 3% of the



total population may have the disorder to a clinically significant level that seriously impairs their social, educational and occupational functioning.

The NHMRC report also raises the issue of gender and age issues in the incidence of A-D/HD, with the disorder being 4 to 9 times more prevalent in boys than in girls (NHMRC, 1997, p, 14). The diagnosis of children at various ages and the severity of symptomatic behaviours also varies. Research has shown that there is a tendency for the number of symptoms to decrease with age (Barkley, 1996) so that the number of symptoms may decrease during adolescence to the extent that some individuals no longer meet the diagnostic criteria (NHMRC, 1997). The issue of gender is reflected in this thesis by the Researcher's use of males as participants. During the initial stage of the research phase, the Researcher was able to identify only 3 females who met the criteria for participation in the A-D/HD group, compared to 23 males. On this basis it was decided not to use females, as this would introduce a further variable in the research and the small number of girls would have raised problems in comparisons due to the relative size of the groups involved (Keppel, 1982; Norusis, 1993; 1994; Walker, 1985).

Recent theoretical explanations of A-D/HD have proposed that the disorder centres on the concept of *Executive Function*. This refers to the individual's ability to inhibit initial (especially premature) motor and affective response to events. In the *Behavioural Disinhibition model* deficits or impairments in the *Executive Functions* are seen as the core problem of A-D/HD, rather than attentional deficits *per se*.

This conceptualization of the disorder has major implications for the learning and behaviour of A-D/HD individuals, as the non-perception or mis-perception of the consequences of the individual's behaviour limits their performance on many tasks and their ability to exert self-control (Barkley 1990, p. 73; 1998, p. 48; Edwards & Barkley 1997, p. 14).

The normal functioning of behavioural inhibition consists of two linked processes; the delay and the protection of the delay of responses to stimuli. These are; the capacity to inhibit prepotent responses, either prior to the response, or on initiation, creating a delay in the response to the stimulus. Subsequently there is the protection of this delay, the self-directed actions occurring within it, and the goal-directed behaviors they create from the interference by competing events and their prepotent responses (interference control) (Barkley, 1998).

This protection of the delay effects both the immediate and later consequences of the behaviour: Through the postponement and delay of the prepotent response and the creation of this protected period of delay, the occasion is set for four other executive functions to act effectively in modifying the individual's eventual response(s) to the event (Barkley 1996, p. 71).

The four executive functions which are linked to the normal functioning of behavioural inhibition are described by Barkley (1998):

- *Nonverbal Working Memory* – the ability to retain a mental representation of an event and manipulate it mentally, using hindsight or forethought from previous experience, as well as anticipation and a sense of sequence and of time.
- *Self-Regulation of Affect, Motivation and level of Arousal* – emotional self-control, objectivity and social judgement are all impaired, making it difficult for them to be used effectively in the self-regulation of drives and motivational factors, the regulation of arousal and the use of arousal in a goal-directed fashion.
- *Internalisation of Self-directed Speech* – the ability to describe actions, outcomes, and reflection on these, rule-

governed behaviours. This affects problem solving, questioning and moral reasoning.

- *Reconstitution* – analysis and synthesis of concepts and processes, verbal fluency, goal directed creativity.

Without effective selective attentional capacities, the ability to predict consequences and, as a result of this, to inhibit responses, individuals with A-D/HD are unlikely to understand the causal relationships between their actions and the consequences of these actions. They will therefore be unlikely to perceive that their actions have any impact on what happens around them. These individuals will be less able to form opinions regarding their own worth if they do not have a sense of internal self-determination. In psychological terms this is defined as having an external Locus of Control (Bandura, 1986).

The extent to which an individual perceives that the reinforcement they receive is contingent upon their own behaviour, skills, or attributes, rather than actions of other people or organisations, chance, or luck, is also then the extent to which that reinforcement is effective for that individual. In psychological terms this is defined as having an internal locus of control.

Social learning theory, and in particular attribution theory, has been a fruitful area of research in social psychology for many years. The influence of environment and externality on attributions of causality has been examined by a number of authors, notably Julian Rotter (1954; 1960; 1966; 1982) and Albert Bandura (1986; 1977; 1997).

The construct of Locus of Control provides a potentially important mechanism for addressing and ameliorating the behavioural effects

of A-D/HD through developing a more internal perceived Locus of Control, particularly in children and adolescents.

Perceived Locus of Control and the tendency to a consistent pattern of attributions based on this have been investigated in some depth as factors in classroom success or failure for children with a range of ability levels and other characteristics across a range of settings (Graham, 1997; Lefcourt, 1982; Tiggemann & Crowley, 1993).

Changing the perception of Locus of Control for academic success from externalising to internalising, or at least making it somewhat more internalising, has been demonstrated to be effective in improving academic performance and behaviour for the participants (Autry & Langenbach, 1985; Tiggemann & Crowley, 1993). Interventions which assist in a more internal perceived Locus of Control have contributed to improvements in social and academic outcomes for students (Braswell & Bloomquist, 1991; Lefcourt, 1982; Workman, 1982)

Both A-D/HD and perceived Locus of Control, studied independently, have a considerable literature behind them, but until recently no attempt has been made to examine one in the light of the other. In particular, no research has investigated whether it is possible to reduce the level of externality of perceived Locus of Control of boys diagnosed with A-D/HD through the use of an appropriate cognitive - behavioural intervention.

It is important to consider the following:

What is presently known about the extent to which individuals with A-D/HD make attributions of causation for their behaviour, and the direction of their attributions? By an examination of the literature on these fields can we gain a better understanding of the

implications of A-D/HD for perceived Locus of Control? Finally, does this understanding help us to develop better management strategies for individuals with A-D/HD?

The limited research that has been published examining the perceived Locus of Control of children with A-D/HD will be discussed more fully in chapter four of this thesis. The studies which have been conducted have confined themselves to measuring the perceived Locus of Control of children with A-D/HD, with no discussion of the implications that change to the perceived Locus of Control might have for the management of A-D/HD.

Two studies found that the mean scores of children with A-D/HD on the most frequently used measure of perceived Locus of Control for children, the Children's Nowicki and Strickland Internal External Scale (CNS-IE, Nowicki & Strickland, 1973) were significantly higher than the scores of their non - A-D/HD peers (Linn & Hodge, 1982; Lufi & Parrish-Plass, 1995). Neither study discussed any substantial reason for the difference, nor any implications of their findings.

The studies which went into the greatest detail about the assessment of Locus of Control in children with A-D/HD found that the individuals who were more externalizing responded better to an externally delivered reinforcer, whilst self-administered reinforcement was more effective for those who were more internalizing (Bugental, Collins, Collins, & Chaney, 1978; Bugental, Whalen, & Henker, 1977). However, neither of these studies considered the significance of this outcome for therapeutic interventions. The possibility of inducing change in perceived Locus of Control to benefit children with A-D/HD appears not have been considered in the literature to date.

Another study, this time investigating social success and failure, found that boys with A-D/HD were more likely to attribute failure externally and success internally than were their non-A-D/HD peers. This study concluded that there were implications for management of the behaviours seen in cases of A-D/HD, and, that there was a need for further research to “examine the relationships among behavior, affect, and cognitive - behavioral states of this high risk population” (Hoza, Pelham, Milich, Pillow & McBride, 1993, p. 284)

If further research is to achieve progress in our understanding of this complex disorder, then it is important to conduct research with appropriate degrees of control. Applied research in education and in psychology is inevitably complicated by a myriad of variables. It is therefore desirable to specify those variables of demonstrated significance and attempt to control for them as far as possible. In the study of A-D/HD, these significant variables include gender, age, comorbid disorders, and other conditions, such as global developmental delays, which share a number of symptomatic behaviours with A-D/HD.

An issue which has arisen in the literature on A-D/HD that has considerable potential to influence the data is the way in which parents and teachers view A-D/HD. The existing literature contains a number of reports which indicate that the behaviours that are identified vary depending upon the observer’s perspective (Atkins & Pelham, 1991; Bailey & Curtis, 1997; Barkley, 1990; DuPaul, 1992). More recent work indicates that the distinction between parent and teacher ratings of behaviour (as opposed to anecdotal reports) may not be so great as previously thought (Du Paul, Anastopoulos, McGoey, Power, Reid, & Ikeda, 1997; Du Paul, Anastopoulos, Power, Reid, Ikeda, & McGoey, 1998).

These issues will be addressed later in this thesis, particularly in Chapters six and nine.

As stated at the beginning of this chapter, three Research Objectives will be addressed in this research. They are:

1. *To investigate the relationship between perceived Locus of Control and attentional deficiency, with greater externality hypothesized to be associated with greater deficits in attention.*
2. *To explore whether perceived Locus of Control differentiates between boys diagnosed with clinical levels of A-D/HD and their classroom peers with normal attentional capacities.*
3. *To determine whether a Cognitive – Behavioural Intervention significantly reduces the externality of perceived Locus of Control in boys with A-D/HD.*

In order to establish the significance of these objectives it is first necessary to examine the concepts which lie behind them. In Chapters two and three the history and development of A-D/HD and Locus of Control will be discussed in detail, along with methods by which they can be assessed, and, in the case of A-D/HD, the interventions which are effective in managing behaviours associated with the disorder.

Chapters four and five address issues regarding the specific instruments and techniques employed in the research program. The measurement instruments and intervention will be detailed and discussed. This will lead to the exposition of the results of the assessment and intervention in chapter six, seven and eight, aligned to the three Research Objectives stated above. Each of these

three chapters concludes with a discussion of the results and their implications for educators, psychologists, and parents, and proposes questions for further research which have arisen as a result of the research program for this thesis.

Chapter nine extends the research by examining statistical relationships between the various scales of the parent and teacher ratings of behaviours indicative of A-D/HD through the use of Hierarchical Cluster Analysis and Discriminant Analysis. Apparent differences between parent and teacher ratings have often been seen as a cause for doubts regarding the salience of behavioural characteristics of A-D/HD, or even of its very existence (Barkley, 1990; 1995; Jordan, 1992). The examination of ratings through *Discriminant Analyses* and *Cluster Analyses* will throw new light on the relationship between ratings by parents and teachers, to determine their relative contributions to the management and education of boys with this disorder.

Chapter ten presents the conclusions and recommendations for the research, along with issues that have been raised by the research.



# **Glossary**

## **Attention-Deficit/Hyperactivity Disorder**

Attention-Deficit/Hyperactivity Disorder (A-D/HD) is defined in the Diagnostic and Statistical Manual, Fourth Edition (DSM-IV) of the American Psychiatric Association (1994) in the following terms:

The essential feature of Attention-Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity/impulsivity that is more frequent and severe than is typically observed in individuals of a comparable level of development (Criterion A).

Some hyperactive/impulsive or inattentive symptoms that cause impairment must be present before age 7 years, although many individuals are diagnosed after the symptoms have been present for a number of years (Criterion B).

Some impairment from the symptoms must be present in at least two settings (e.g., at home and at school or work) (Criterion C).

There must be clear evidence of interference with developmentally appropriate social, academic, or occupational functioning (Criterion D).

(APA, 1994, p. 78)

## **Locus of Control**

Locus of Control is defined by Penk (1969) as :

The generalised expectancy for internal versus external control of reinforcements. Internal control refers to the belief that reinforcement follows, or is the result of, each person's own actions. External control refers to the expectation that reinforcement occurs as a result of luck, chance, or through control of others.

(Penk, 1969, p. 856)

## **Cognitive - Behavioural Intervention**

Cognitive - behavioural interventions are defined by Braswell and Bloomquist (1991) as follows:

[T]he term cognitive - behavioural interventions refers to approaches such as self-instructional training, problem-solving training, attribution retraining, and stress inoculation procedures. Self-instructional methods involve training children to use or develop self-guiding speech as an aid to academic or social problem-solving. Self-instruction often incorporates elements of problem-solving training, such as learning to recognize the existence of a problem, generating alternative problem solutions, evaluating the consequences of different alternatives, and reviewing the outcome of the selected alternative. Attributional retraining involves helping a child to reappraise his/her explanations for particular outcomes

or events, often with the goal of helping the child adopt a more functional belief system regarding the value of his/her effort.

(Braswell & Bloomquist, 1991, pp. 90 - 91)

## **Discriminant Analysis**

Discriminant Analysis is the statistical technique used to identify variables that are important in distinguishing between mutually exclusive groups of cases (or individuals) and to develop procedures which predict group membership for new cases whose group membership is undetermined.

The concept underlying Discriminant Analysis is fairly simple and intuitive. Linear combinations of the independent, or predictor, variables are formed and serve as the basis for classifying cases into one of the groups (Norusis, 1993, p. 1).

## **Cluster Analysis**

Cluster Analysis is used to form groups of similar objects. In Cluster Analysis group membership for all cases is initially unknown. The goal of the technique is to identify homogenous groups or clusters.

Cluster Analysis involves two measures - *Distance*, which indicates how far apart two data objects are, and, *Similarity*, which measures the closeness of two data objects (Norusis, 1993, pp. 83 - 84).

## **Chapter 2**

### **Attention-Deficit/Hyperactivity Disorder**

The aim of this chapter is to establish that the condition of Attention-Deficit / Hyperactivity Disorder (A-D/HD) reflects deficits in a person's capacity to attend to, and therefore learn from the consequences of their own behaviour and that of others.

This chapter reviews the history, aetiology, diagnosis and treatment of A-D/HD. Chapter three details the importance of attention and Locus of Control and its interaction with A-D/HD in determining effective learning. Logically, individuals with a persistent and pervasive difficulty in attending appropriately to stimuli will not experience effective learning. When these attentional deficits are sufficiently impairing, and usually in combination with substantial levels of hyperactivity and impulsivity, they fall within the diagnostic category of A-D/HD.

## **2.1 A History and Overview of Attention - Deficit/Hyperactivity Disorder**

Early observations of behaviour that today would be included under the diagnosis of A-D/HD date from the middle of the nineteenth century (Green & Chee, 1994). Among these references is a case reported by a German physician, Hoffman, regarding one of his clients whom he referred to as “fidgety Phil”. This report has been widely recognized as possibly the earliest clinical description in the literature and it included a presumption that the behaviours must be the result either of congenital brain damage, or of subsequent injury to the brain (cited in Braswell & Bloomquist 1991), a diagnostic position that held sway for many years thereafter (Barkley, 1995; Green & Chee, 1994).

William James (1890) in one of the earliest definitive works on psychology alludes to poor attention and impulsiveness as symptoms typical of a lack of moral development, hinting at the rôle of self-control in the disorder, a point echoed by Still (1902, cited in Braswell & Bloomquist 1991, and also in Green & Chee, 1994) in his studies of children referred to him for other reasons. The behaviours appeared to Still to be inborn and without other obvious causes.

Contemporaneously with the ideas of James and Still, other professionals and researchers were examining the behaviours from a medical perspective, one which became the dominant view for most of the first half of the twentieth century. The central feature of the medical approach to these cases was the theory that the behaviours typical of what is now termed A-D/HD arose from brain damage. Alfred Tredgold, in 1908 (cited in Barkley, 1990), developed the idea of minimal brain damage further, positing that brain damage which occurred at birth (due to physical trauma, anoxia, etc) could remain with no obvious effects until the child commenced formal education at around age six (Barkley 1990; Chandola,

Robling, Peters, Melville-Thomas & McGuffin, 1992).

In the United States interest in this constellation of symptoms increased after an epidemic of encephalitis in 1917-1918. The terminology used at that time was *Brain Damage Syndrome*, reflecting the perceived nature of the impairment and (by terming it a syndrome) indicating a consistent pattern of symptoms and impairment (Barkley; 1990, Braswell & Bloomquist, 1991).

The diagnosis of *Brain Damage Syndrome*, in substantially the same form, was the dominant opinion on attentional problems and hyperactivity up until the nineteen - thirties and was still being diagnosed as such, albeit less commonly, until the early nineteen - sixties (Barkley, 1998; 1990; Dubey, 1976; Rutter, 1977).

Under that conception of the disorder, hyperactivity and related behaviours were considered to be purely the result of brain damage; resulting from illnesses such as encephalitis or meningitis, (Rutter, 1977) or resulting from direct insult to the brain itself (Fletcher, Ewing-Cobbs, Miner & Levin, 1990). Commonly it was presumed this was due to accidental injury during childhood, from falls, traffic accidents and so forth. Some of the later interpretations of this model during the nineteen - fifties and nineteen - sixties also added perinatal difficulties, including anoxia at birth and damage caused by forceps deliveries, for example, as major causes of attentional problems and hyperactivity specifically, as well as for behavioural and learning problems more generally (Farnham-Diggory, 1981).

Rutter (1977), in his examination of the relationship between A-D/HD symptoms and brain damage, found that for 95% of children with hyperactive, inattentive, and impulsive behaviours, no signs of brain damage existed. However, the majority of children with brain damage did not in fact display attentional problems or hyperactivity. In many ways

this finding was the final pronouncement on the subject, since brain damage has not subsequently featured as a wide-spread causal factor of A-D/HD to any extent in the literature.

Overlapping this in time, behavioural disturbance as a result of brain injuries was by the late nineteen - forties frequently termed *Strauss' Syndrome* in the literature, after one of the major contributors to the area, Alfred Strauss.

In descriptions of *Strauss' Syndrome* the emphasis was rather more often upon impulsiveness rather than hyperactivity. Although Strauss and Lehtinen (1947) reported that in many of these cases stimuli which would tend to elicit an active response from these children were far more frequently and rapidly responded to than were stimuli which elicited a passive or non-motor response. These observations of behaviour are now seen as being consistent with the current conception of A-D/HD at present as a failure of behavioural inhibition (Strauss & Lehtinen, 1947).

Numerous individual cases cited by Strauss and Lehtinen demonstrated behaviour which is clearly consistent with what today would be a diagnosis of A-D/HD. But in several of the cases the severity of the brain damage, or even its existence, seems open to question, as the following example demonstrates:

Birth normal. When 3 months old he fell out of a buggy. Medical examination on admission, negative, neurological examination, slightly indicative for brain-injury. No neuromotor impairment.

Strauss and Lehtinen (1947, p. 87)

The outcome of such studies was to focus interest on the form and location of the injury and means for treatment of what by then was

termed the *Minimally Brain Damaged* child (Strauss & Lehtinen, 1947). The variations in the level of intellectual ability on the part of the children in the case studies ranged between average ability to moderately intellectually disabled. Strauss and Lehtinen frequently point out major discrepancies between verbal abilities and performance / motor abilities in the children being studied.

The alternative explanation for the behaviours at the time was that they represented deficiencies in moral development, a view first raised by Still at the turn of the century. Such deficits are discussed at some length in several cases by Strauss and Lehtinen, both in contrast to and consistent with physical damage (Strauss and Lehtinen, 1947).

There has been little or no conclusive evidence produced to support minimal brain damage, or other forms of organic disorder, as a *primary* cause of A-D/HD (Dubey, 1976). This conclusion was reached following electro-encephalogram (EEG) studies, as well as examinations of possible soft neurological signs. Dubey's conclusions were that those abnormalities which were detected were not associated with high levels of hyperactivity, an association which would be expected if brain damage is in fact the underlying cause of cases of A-D/HD (Dubey, 1976, p. 362).

In this evaluation of the literature then available it was noted that there are methodological difficulties with many of the studies being examined. Meta-analysis indicated that in the great majority of cases the studies lacked rigour as they were not conducted blind, but involved children who had been previously diagnosed, and frequently without the use of control subjects (Dubey, 1976).

Similarly, no differences have been found in the EEG records of children who had been diagnosed as hyperactive. A study of 20 hyperactive, 20 neurotic, and 20 normal children, found no significant differences, nor was there a relationship between severity of hyperactivity and



abnormality of EEG traces (Werry, Minde, Guzman, Weiss, Dogan, & Hoy 1972).

When children with A-D/HD were compared to non A-D/HD peers and matched for IQ and age, no differences in EEG were identified (Satterfield, Cantwell, Lesser & Podosin, 1972).

The increasing number of these observations of children in whose developmental histories no trace of injury could be found, but with biochemical and neurological abnormalities, led to a re-examination of the area (Croll & Moses, 1985). By the middle of the nineteen - sixties the mainstream term for what is now A-D/HD had changed to *Minimal Brain Dysfunction*, a change which reflected an increasing awareness that for the majority of cases actual brain damage was not present, but that there appeared to be a more subtle level of dysfunction in the brain which resulted in A-D/HD behaviours and, it was by now thought, many learning difficulties as well (Campbell, 1976; Green & Chee, 1994; Nichols & Chen, 1981; Taylor, 1985).

This conceptualisation still implied a solely organic cause for the disorder, with little or no recognition of environmental factors such as parenting and teaching styles, level of structure, organisation and functionality of home and school environments as well as the effects of reinforcement on the behaviours. At the time symptoms were conceptualised as follows:

1. Specific Learning Difficulties
2. Perceptual - Motor Deficits
3. General Coordination Deficits
4. Hyperkinesis
5. Impulsivity
6. Emotional Lability
7. Short Attention Span and/or Motor Distractibility
8. Equivocal Neurological Signs, and
9. Borderline Normal or Abnormal EKG.

Nichols and Chen (1981)

The recognition that attentional difficulties are a far more important problem for many more children than those who are clinically diagnosed with hyperactivity or impulsiveness, marks a significant change of direction in the conceptualization of A-D/HD (Loney, Langhorne & Paternite, 1978).

This study came at the end of a series of reports that had investigated ratings of children's behaviour using a variety of statistical techniques. The predominant technique was factor analysis of parent and teacher ratings of behaviour, which resulted in three separate dimensions of the hyperkinesis or hyperactivity disorders, *inattention*, *impulsiveness*, and *aggression/conduct disorders*, being identified. The growing body of evidence for this structure later contributed to the major changes in

diagnostic criteria and characteristics of the disorder subsequently incorporated in DSM-III (APA, 1977) (Barkley, 1990; 1995; 1996; Braswell & Bloomquist, 1991; Marwit & Stenner, 1972).

Fundamental to this was the recognition of attentional disorders both with *and* without hyperactivity, which placed the emphasis firmly upon attentional difficulties as the primary focus of the disorder (Block, 1977; Henker & Whalen, 1981; Schachar, 1991). The next substantial change in accepted diagnostic criteria came in 1987 with the publication of the DSM-III-R (APA, 1987), which with its single, undifferentiated, diagnosis was seen to represent a retrograde change by a number of researchers and practitioners (Henker & Whalen, 1981).

The current diagnosis in DSM-IV (APA, 1994) has rectified this lack of differentiation as a consequence of field trials and fine - grained examination of the behaviours observed in cases of A-D/HD (Barkley, 1996; 1998; Lahey, et al., 1994; Lahey et al., 1998; Wolraich, Feurer, Hannah, Baumgaertel & Pinnock, 1998)

The symptoms of the disorder have been conceptualized and re-conceptualized several times, both in terms of their diagnostic significance and the extent to which they are present at some level of severity in all individuals. These changes are reflected in the changes to the criteria provided by the various editions of the Diagnostic and Statistical Manual of the American Psychiatric Association in DSM I through to DSM-IV (APA, 1968; 1977; 1987; 1994) over a period of three decades.

In the last decade research has demonstrated that A-D/HD is largely a neurological and developmental disorder (Anderson, 1997, Barkley, 1990; 1996; 1998, Gingerich, Turnock, Litfin & Rosén, 1998). This has major implications for treatment of individuals with A-D/HD and a major government report (NHMRC, 1997) has recommended a multidisciplinary

approach to the diagnosis and treatment of the disorder, involving educational and psychological evaluations and interventions in conjunction with medical strategies for diagnosis and treatment.

It is therefore established that deficits in attention clearly exist and are a key factor in the capacity of individuals so affected to attend to, and learn effectively from, events and stimuli in their environment.

## **2.2 Aetiology of Attention - Deficit / Hyperactivity Disorder**

At this point in the thesis it is necessary to pose the question: What are the causes of these observed deficits in attention and associated behaviours?

A-D/HD is primarily a disorder either of the brain as a whole or of specific portions of the brain, particularly those which involve the regulation of affect and control of behaviour.

The present view of A-D/HD is that it is a developmentally disabling condition which is generally chronic in nature, has a strong biological or hereditary predisposition and that it has a significant negative impact on academic and social outcomes for many children (Barkley, 1990, p. 36).

Evidence from research and clinical practice supports a number of potential explanations. These presently fall into three main groups, delineated as follows:

- General and/or specific brain damage theories,

- Affect as a major seat of the pathology theories,
- Inappropriate or dysfunctional neurological activity theories.

Each of these aetiological categories will be examined in detail. Additionally, there are theories which regard A-D/HD as a reaction to, or from factors in the psycho-social environment such as inappropriate parenting or parental response styles, so an acquired response to these factors. Other theorists such as Feingold (1975) have related A-D/HD to a disturbance in the metabolic and/or immune system characterised by allergies to certain foods and chemicals such as colouring agents, preservatives, sugar, gluten, yeast, or dairy products (Sattler, 1992; Kauffman, 1985).

Presently the dominant view places most emphasis on the third category, with evidence supporting theories of neurotransmitter abnormalities, with a strong genetic predisposition towards A-D/HD developing in families where there is a history of the disorder (Barkley, 1996; 1998; Edwards & Barkley, 1997).

### **2.3 General or Specific Brain Damage Theories**

The first set of theories represent the original position on A-D/HD, which has been discussed at length. They centre around trauma caused by prenatal injury, perinatal insult (most often anoxia) and postnatal and childhood injury. However, the evidence (Lambert et al., 1976) indicates that hyperactivity is not highly represented amongst brain-injured children, nor have most hyperactive children suffered from brain trauma.

A study published in 1991 indicated that there were differences in the corpus callosum of A-D/HD boys when compared to their non-A-D/HD

peers. The corpus callosum of the A-D/HD participants had a coarser structure and was seen to be less efficient in the transmission of information between the two cerebral hemispheres (Hynd, Semrud - Clikeman, Lorys, Novey, Eliopoulos & Lyytinen, 1991). The results of this study must be viewed with some caution as there were only 20 participants in the study and the Researcher has been unable to locate any evidence of a subsequent replication of these results.

## **2.4 Affective Disturbance Theories**

The second set of theories centre around research showing that some A-D/HD children have been found to be suffering from emotional instability, stress due to difficulties at home, and problems in adapting to differing environments (primarily home vs school) (Lambert et al., 1976; Whalen and Henker, 1991).

The importance of this perspective peaked in the early nineteen - seventies when the divergent psychological perspectives embodied by Bruno Bettelheim (1973, cited in Barkley, 1990) and Ivar Lovaas (1971) both expressed the belief that A-D/HD was a result of stress and antagonism from the high frequency of negative interactions between parents and children who had been labelled as hyperactive. Subsequent evaluations of the area have failed to support these hypotheses as a causal factor in a majority of cases (Barkley, 1995).

It is still, however, seen by some researchers and practitioners that emotional factors may account for a small number of cases and probably exists as a factor exacerbating the severity of a somewhat larger number of cases (Barkley, 1995; Braswell & Bloomquist 1991; Jordan, 1992).

## **2.5 Neurological Activity Theories**

The final group of theories are those which are based on findings of abnormal levels of certain chemicals in the brain. The neurotransmitters which have been implicated are monoamines: Serotonin, Norepinephrine, and in particular, Dopamine (Barkley 1998; Evans & Pelham, 1991; Silver, 1971). The abnormalities are usually taken to be linked to delayed or abnormal developmental processes in the child. The evidence for this as the primary cause has increased since then, with numerous studies finding abnormalities in the noradrenergic and dopaminergic systems (Barkley, 1990; 1995; 1998; Barkley & Edwards, 1997; Hallahan & Cottone, 1997).

Currently it appears that the major specific mechanism by which A-D/HD occurs is related to a failure to produce sufficient catecholamine neurotransmitters at the synapses. Stimulant medication enhances function of both dopaminergic and also noradrenergic neurones, which stimulates the limbic system, reticular activating system, and the prefrontal cortex. These are the areas controlling attention, inhibition, and arousal (Campbell, Gonzalez, & Silva, 1992; Schweitzer & Sulzer - Azaroff, 1995; Vyse & Rapport, 1989). The stimulation of these areas would appear to provide greater control. The effects of Methylphenidate as a noradrenergic agonist are well established, although the mechanism of action is still being debated (Barkley, 1990; 1996; 1998; Edwards & Barkley, 1997; Gainetdinov, Wetsel, Jones, Levin, Jaber & Caron, 1999; Green & Chee, 1994; Hallahan & Cottone, 1997; Henker & Whalen, 1991; Jarman, 1992; Quay, 1997).

Preliminary results from recent research indicate that the two most commonly prescribed psychostimulant medications, Dexamphetamine and Methylphenidate, may have slightly different mechanisms. Further recent research has found that psychostimulants have effects on the Frontal Cortex, Limbic System, and most recently the Basal Ganglia

(Barkley, 1990, p 576; 1998 p. 46; Faraone & Biederman, 1998; Vaidya, Austin, Kirkorian, Ridlehuber, Desmond, Glover & Gabrieli, 1998).

In Australia the psychostimulants which are usually prescribed are Dexamphetamine and Methylphenidate Hydrochloride, generally referred to as Methylphenidate, available under the trade-name *Ritalin* (National Health & Medical Research Council (NHMRC), 1997). These medications have been prescribed for over sixty years (Bradley, 1937) and have clear beneficial effects on functioning in the majority of cases (Barkley, 1998; Berman, Douglas & Barr, 1999; Garber, Garber & Spizman, 1996; Northup, Fusilier, Swanson, Huete, Bruce, Freeland, Gulley & Edwards, 1999; Rapoport, Buchsbaum, Zahn, Weingartner, Ludlow & Mikkelsen, 1978). These results confirm the view that neurotransmitter differences must be an important factor contributing to A-D/HD.

## **2.6 Genetic Factors in Attention - Deficit / Hyperactivity Disorder**

The origins of the deficiencies in neurotransmitters may represent a hereditary condition, rather than being a result of neurological damage, or a consequence of learned behaviour. If so it is likely that there is a vulnerability to develop the disorder, rather than the direct transmission of the disorder (Barkley, 1997; 1998; NHMRC, 1997).

Research has identified adult forms of A-D/HD in the parents, most notably the fathers of Attention-Deficit/Hyperactivity Disordered children (Barkley, 1998; Faraone et. al., 1993; Thapar, Holmes, Poulton & Harrington, 1999). Silver noted that there appeared to be the possibility of an inherited predisposition for delayed neurological



maturation, especially in the cognitive and motor areas (Silver, 1971).

There is a clearly identified trend for the parents of A-D/HD children to have been A-D/HD themselves in childhood (Cantwell, 1972). The probability of monozygotic twins both being A-D/HD is reported to be higher than for dizygotic twins. The overall estimate of the heritability of A-D/HD was 0.77, with a higher level (0.83) for boys than for girls (0.58) (Willerman, 1973).

There is also a strong association between A-D/HD and the dopamine transporter gene in cases where both parents of Attention - Deficit /Hyperactivity Disordered children were themselves Attention - Deficit / Hyperactivity Disordered (Cook et al., 1995; Rhee, Waldman, Hay & Levy, 1999; Rutter, Silberg, O'Connor & Siminoff, 1999; Waldman et. Al., 1998). This is becoming more clearly evident through the examination of methodologically sound twin studies and adoption studies.

Some of these studies report correlations in hyperactivity and/or inattention leading to heritability scores of between .91 and .39 when comparing monozygotic and dizygotic twins respectively. The same study reports significantly higher rates of A-D/HD symptoms among the biological parents of adopted A-D/HD children than their adoptive parents (Thapar, Holmes, Poulton, & Harrington, 1999).

It is clear from the accumulating evidence that there is a genetic component to A-D/HD, associated with a neurotransmitter dysfunction.

## **2.7            The Behavioural Disinhibition**

### **Conceptualization of Attention - Deficit / Hyperactivity Disorder**

At present the dominant model of the causes of A-D/HD is that in most clinical cases it is the result of biochemical imbalances in the brain. Specifically it is the under-production of particular neurotransmitters (Serotonin, Noradrenaline, Dopamine) that underlies the disorder.

The evidence for this aetiology has been accumulating for over a decade as the capability of examining brain activities through scanning technologies has developed. By 1995 the published evidence for this aetiology was very strong and it is fair to say that in terms of the neuropsychology of A-D/HD there is an almost complete absence of controversy regarding this (Barkley, 1995; 1998; Edwards & Barkley, 1997).

The causes of these imbalances may well, on the basis of recent research, have a genetic component or predisposing factor. Although the details of this have not as yet been completely worked, there seems little doubt that this will occur before long and will have a major influence on future developments in research and practice (Faraone, Biederman, Weiffenbach, Keith, Chu, Weaver, Spencer, Wilens, Frazier, Cleves & Sakai, 1999; Thapar, Holmes, Poulton & Harrington, 1999).

Given that A-D/HD:

- Exists as a coherent disorder and is best explained as a disorder of neurotransmitter function, and
- That children who have A-D/HD can be reliably and clearly identified.

What, therefore, are the implications of neurotransmitter dysfunction on learning and behaviour?

At the present time the major conceptualization of A-D/HD is laid out by Professor Russell Barkley in a series of publications (Barkley, 1990; 1995; 1996; 1998). Although he does not entirely follow the DSM-IV conceptualization (Hallahan & Cottone, 1997, p. 33), Barkley presents a comprehensive model for attention problems and hyperactivity / impulsivity that is conceived as follows:

ADHD consists of developmental deficiencies in the regulation and maintenance of behavior by rules and consequences. These deficiencies give rise to problems with inhibiting, initiating, or sustaining responses to tasks or stimuli, and adhering to rules or instructions, particularly in situations where consequences for such behaviour are delayed, weak, or nonexistent. The deficiencies are evident early in childhood and are probably chronic in nature. Although they may improve with neurological maturation, the deficits persist in comparison to same-age normal children, whose performance in these areas also improves with development

(Barkley 1990, p. 71).

Barkley's *Behavioural Disinhibition model* of A-D/HD has as its central concept *Executive Function*. This refers to the individual's ability to inhibit initial (especially premature) motor and affective response to events. In the *Behavioural Disinhibition model* deficits or impairments in the *Executive Functions* are seen as the core problem of A-D/HD, rather than attentional deficits *per se*.

This conceptualization of the disorder has major implications for the learning and behaviour of A-D/HD individuals, as the non-perception or

mis-perception of the consequences of the individual's behaviour limits their performance on many tasks and their ability to exert self-control (Barkley 1990, p. 73; 1998, p. 48; Edwards & Barkley 1997, p. 14).

The *Behavioural Disinhibition model* provides a basis for examining cognitive - behavioural interventions for individuals with A-D/HD both as regards the desired outcomes of the programs and the underlying processes which are being affected by the intervention.

The normal functioning of behavioural inhibition consists of two linked processes; the delay and the protection of the delay of responses to stimuli:

- Capacity to inhibit prepotent responses, either prior to the response, or on initiation, creating a delay in the response to the stimulus and,
- The protection of the delay, the self-directed actions occurring within it, and the goal-directed behaviors they create from the interference by competing events and their prepotent responses (interference control) (Barkley, 1998).

This has an effect on both the immediate and temporally distant consequences of the behaviour:

Through the postponement and delay of the prepotent response and the creation of this protected period of delay, the occasion is set for four other executive functions to act effectively in modifying the individual's eventual response(s) to the event. This is done to achieve a net maximisation of both temporally distant and immediate consequences rather than

the immediate consequences alone for the individual. The chain of goal-directed, future-oriented behaviors set in motion by these acts of self-regulation is then also protected from interference during its performance by the same process of inhibition.

(Barkley 1996, p. 71)

The four executive functions which are linked to the normal functioning of behavioural inhibition are described by Barkley (1998):

- *Nonverbal Working Memory* – the ability to retain a mental representation of an event and manipulate it mentally, using hindsight or forethought from previous experience, as well as anticipation and a sense of sequence and of time.
- *Self-Regulation of Affect, Motivation and level of Arousal* – emotional self-control, objectivity and social judgement are all impaired, making it difficult for them to be used effectively in the self-regulation of drives and motivational factors, the regulation of arousal and the use of arousal in a goal-directed fashion.
- *Internalisation of Self-directed Speech* – the ability to describe actions, outcomes, and reflection on these, rule-governed behaviours. This affects problem solving, questioning and moral reasoning.
- *Reconstitution* – analysis and synthesis of concepts and processes, verbal fluency, goal directed creativity.

The four executive functions influence motor control and fluency. This

means that effective executive functioning is associated with inhibiting non- task-relevant responses or activities, the actual execution of goal-directed responses, novel and/or complex motor sequences, appropriate goal-directed persistence, task re-engagement following distraction or disruption, and the control of behavior by internal representations of stimuli, typically by verbal or visual models (Barkley, 1995; 1996; 1998).

The second of these four processes has been refined somewhat since 1996, as described in Edwards and Barkley (1997), with greater emphasis of the effect on separating the content of an event from its affective charge during the delay in response to the event (p. 15).

In the case of those individuals with A-D/HD:

The impairment in behavioural inhibition occurring in A-D/HD is hypothesized to disrupt the efficient execution of these executive functions thereby delimiting the capacity of these individuals for self-regulation. The result is an impairment in the cross-temporal organisation of behavior, in the prediction and control of one's own behavior and environment, and inevitably in the maximization of long-term consequences for the individual

(Barkley, 1996, p. 74)

The key to Barkley's conceptualisation of A-D/HD is therefore, a breakdown, or dysfunction, of the inhibition of behaviour.

This perspective has major implications for psychological and educational interventions. Primary amongst them is that the underlying biochemical imbalance must be addressed, and that educational programs for students must take into account numerous factors in action, memory, cognition, and socialization, including: poor ability to judge the

consequences of their action, both for themselves and others, endangering others or themselves, irritation or nuisance value, and poor associational learning.

The social inappropriateness of their behaviour, mannerisms, impulsive responses and outbursts leads to alienation from their peers, staff, and sometimes, parents. Poor retention of materials leads to difficulties at school and work, exacerbating other learning difficulties. Poor executive function with respect to reasoning, results in disorganization, and an impaired ability to sequence and integrate information.

One aspect of Barkley's conceptualization that has been addressed peripherally in the past and which the present author views as a major component in the development of self-regulation is the issue of perceived Locus of Control.

As Barkley (1996; 1998) points out, the non-perception or misperception of the consequences of behaviour is central to A-D/HD. This leads to difficulties in effective learning which were noted by Bandura (1986) as stated in chapter one of this thesis.

It is the central hypothesis of this thesis that individuals with A-D/HD will, therefore, have a greater propensity to not make changes to their behaviour as a result of the consequences of their behaviour.

In terms of the *Behavioural Disinhibition model* of A-D/HD, the critical functions which are related to the hypothesis appear to be impairments to the self-regulation of *Nonverbal Working Memory* and *Reconstitution*.

The limited ability to analyse behaviours, reflect on them and their consequences, then develop solutions to situations within an appropriate timeframe means that the A-D/HD individual responds to the external stimulus without regard for the appropriateness of their behaviour or in

realising that they are able to exert control over their response. They will, therefore, fail to learn from the consequences of their own behaviour and that of others.

Having established the nature of A-D/HD and the ways in which it affects behaviour, it is now important to examine the way in which the identification and diagnosis of the disorder is carried out, with particular regard to the symptomatic behaviours.

## **2.8 Diagnosing Attention - Deficit / Hyperactivity Disorder**

Currently, there are two widely accepted schemes of diagnostic criteria for AD/HD. These can be summarised as *Categorical Approaches* and *Trait Approaches*.

The *Categorical Approach* considers that symptoms are causally related and represent clear abnormality. Use of the categorical approach precludes membership in more than one diagnostic category, therefore decisions regarding the relative severity of observed behaviours will have a major impact on the diagnosis (NHMRC, 1997, pp. 13-14).

The *Trait Approach* conceives of behaviour as a continuum and that a disorder represents a position on an extreme end of a particular continuum rather than a specific abnormality. This approach does not preclude multiple diagnoses if the observed symptoms are consistent with multiple disorders, for example A-D/HD and Depression, or Conduct Disorder. It can be seen that the diagnoses of comorbid disorders is much more likely using the Trait Approach (Angold, Costello, & Erkanli, 1999; Barkley, 1995).



A further difference can also be seen in relation to the categorical approach. Central to the categorical approach model of diagnosis are the assumptions that the symptoms stem from a single disorder which is clearly abnormal and which is characteristic of that disorder and no other. This is the diagnostic scheme used by the World Health Organisation in the ICD-10 classification of *Hyperkinetic Disorder* (WHO, 1992).

Given that this typically yields much lower prevalence rates than the trait approach, it is to be expected that in those countries, states, or other jurisdictions, where a categorical approach is stipulated by the health authorities, then a lower level of prevalence will be seen than is the case where a trait approach is stipulated (Tripp, Luk, Schaughency & Singh, 1999).

The 1997 report of the NHMRC (pp. 13 - 14) discusses the differences in prevalence rates under each of the approaches. The report's authors found that research using the *Categorical Approach* yields much lower prevalence rates than do those using the *Trait Approach*, with figures of 0.11% to 2.26 % for the *Categorical Approach* and 6% to 6.06 % for the *Trait Approach*.

Fergusson and Horwood, in a study cited by the NHMRC Report, found that the predictive validity of categorically scored measures of A-D/HD and other behavioural disorders was "less than optimal" (NHMRC, 1997, p. 14). This finding tends to support the use of the *Trait Approach* for diagnosis of A-D/HD and associated disorders (NHMRC, 1997).

This study concluded that the predictive validity of categorical measures varied greatly among those that had been published in various articles (NHMRC, 1997). It is likely that categorical approaches to diagnosis possess low levels of predictive validity to such an extent that many cases may go undiagnosed.

Clarity and reliability are considered important criteria when assessing the accuracy and usefulness of diagnostic criteria (NHMRC, 1997). Categorical approaches may, therefore, fail to provide valid and reliable diagnosis of A-D/HD.

Of the diagnostic schemes which use a *Trait Approach*, the preeminent one is that provided by the American Psychiatric Association in the DSM-IV (APA, 1994) which superseded the previous widely accepted standard, the DSM-III-R (APA, 1987).

Determining the prevalence and degree of A-D/HD is also difficult, given the discrepancies generated by categorical and trait based approaches to diagnosis.

Estimates of morbidity range from 2% or 3% (Barkley, 1998; Lambert et al., 1976; McCarney, 1989) to 20% (Cantwell, 1972; Cantwell & Baker, 1991; Henker & Whalen, 1981), or even to 50% (quoted by Sattler, 1992). The exact morbidity for A-D/HD, as for other behavioural disorders, is obscured by the number of unrecognised cases and those who are tolerated at home and school, either because of parent or teacher expectations, or because their environment is not one which renders them dysfunctional (McCarney, 1989; 1989a). McCarney in his *Attention Deficit Disorders Evaluation Scale Technical Manual* (McCarney, 1989) indicates that scores on that instrument which are in the lowest 3% of the population, and approximately 2 standard deviations below the mean, should constitute grounds for a formal diagnosis of A-D/HD.

Indeed, the prevalence level of approximately 3% is consistent with that expected from a trait approach to diagnosis for the range of psychological and psychiatric conditions more generally. The DSM-IV cites a range of 3% to 5% for school age children (APA, 1994, p. 82) for A-D/HD.

For some adolescents there is a tendency for A-D/HD symptoms to

disappear with increasing maturity, as demonstrated in one study in particular, where approximately 80% of the subjects tested presented diminished symptoms, or a complete absence of symptoms during adolescence (Campbell, 1976).

More recent research on this topic indicates that symptoms tend to persist into adolescence and adulthood to greater extent than previously believed, albeit at a slightly reduced level, or presenting in a different way (Beiderman, Faraone, Milberger, Curtis, Chen, Marrs, Ouellette, Moore & Spencer, 1996; Gittelman, Mannuzza, Shenker, & Bonagura, 1985). The NHMRC report on A-D/HD concludes that much more research into the prevalence of the disorder in adolescence and adulthood is required before firm figures can be developed (NHMRC, 1997).

Of the remaining A-D/HD population, some fall into what is termed residual type A-D/HD (DSM-III-R, APA, 1987), whilst others have difficulties in social skills and interpersonal relationships, as well as remaining academically underachievers, even though their symptoms are below the threshold for clear diagnosis (Kanbayashi, Nakata, Fujii, Kita & Wada, 1994).

It has been noted that the related behavioural disorders *Oppositional Defiance Disorder* and *Conduct Disorder* often become apparent in adolescence, although they are present at younger ages in some individuals (Barkley 1990; Campbell, 1976).

Lambert, Hartsough, Sassone and Sandoval (1987) found that 20% of their subjects ( $n = 117$ ) were free of symptoms after a three year follow up examination (ages 12 - 15), 37% presented with significantly reduced severity of symptoms and were not receiving any treatment, due to the low intensity of the symptoms. The remaining 43% were still considered to be A-D/HD and were receiving some form of treatment for this as well as for learning difficulties.

As has been discussed, there are several disorders significantly comorbid with A-D/HD, including *Oppositional Defiance Disorder* (ODD) and *Conduct Disorder* (CD). Learning, Anxiety and Mood Disorders appear to be more prevalent than in the general population and it is not infrequently found in sufferers of Tourette's Syndrome (DSM-IV, p. 81). The recent research literature contains numerous studies which support this finding (Biederman, Newcorn & Sprich, 1991; Fergusson, Horwood, & Lynskey, 1992; Hallahan & Cottone, 1997; Lowe, Cohen, Detlor, Krimeritzer, & Shaywitz, 1982; Stanford & Hynd, 1994).

A 1993 publication of U.S. National Institute of Mental Health (NIMH) cites the prevalence of Attention-Deficit/Hyperactivity Disorder as estimated by DSM-III-R at 3% to 5% of school age children (NIMH, 1993). The prevalence rate for the UK in the nineteen - eighties has been reported as being approximately 1.7% (Taylor, Sandberg & Thorley 1985, Reported in NHMRC 1997).

The Western Australian Child Health Survey (Zubrick et al., 1995, 1996, 1997) reported a prevalence for Western Australia of 1.6% of the population, based on a sample of over 1200. This is noticeably lower than what would be expected on the basis of clinical morbidity rates and it is likely that there are up to 1% to 2% more who are undiagnosed. The NHMRC report cites studies which give an Australian prevalence between 2.3% and 6%, based on previous research findings over the previous two decades (NHMRC, 1997).

The discrepancies can partly be explained by the use of differing approaches to diagnosis as previously discussed; the *Categorical Approach* yields lower prevalences than does the *Trait Approach*.

The DSM-IV (APA, 1994) does not venture prevalence figures for adolescent and adult populations. Recent publications, particularly those by Barkley (1996; 1998) see this area, along with the development of

modifications to diagnostic criteria on the basis of age, as major issues to be addressed before the next revision of the Diagnostic and Statistical Manual is published.

The diagnostic criteria for A-D/HD from the DSM-IV state that the main characteristics of the disorder are inattentiveness, impulsiveness, and hyperactivity. By specifying that onset occurs before the age of seven, it is intended to exclude a negative reaction to the commencement of formal schooling, whilst the minimum duration of six months is intended to exclude short term reactions to stressful events in the child's life.

Academic underachievement is commonly found in A-D/HD individuals (Anderson & Stanley, 1992; Conway, 1998; Lambert & Sandoval, 1980; M<sup>c</sup>Burnett & Pfiffner, 1991), whilst low self esteem, lability of mood, low frustration tolerance and aggression are also often found in these cases (Atkins & Pelham, 1991; Campbell, 1976; Farnham-Diggory, 1981; Landau & Moore, 1991; Sattler, 1992; Stein, Szumowski, Blondis & Roizen, 1995). Diagnosis in preschool aged populations is difficult, and so, less frequent, although where this occurs the behaviours tend to be quite extreme (Edelbrock & Costello, 1988).

Hyperactivity is generally considered to be the first symptom to present (Luiselli, 1991), and is most typical of parent referred children (Schachar, 1991; Taylor, 1985), whilst inattention is somewhat more frequent when the initial referral comes from the child's teacher(s) (Croll & Moses, 1985). Taylor (1985) quotes case histories of children who were assessed at early ages; from three years upwards, with hyperactivity and abnormal sleeping patterns forming the core of the referrals.

Typically it has been found that males are more likely to be diagnosed as A-D/HD, with up to 90% of cases being reported in boys as opposed to girls (Campbell, 1976; Croll & Moses, 1985). Barkley (1990) quotes a ratio of between 4:1 and 9:1 of males to females. Recent research indicates that

the severity of symptoms in females is similar to that in males, even though the disorder is still seen as being less prevalent in females than in males (Biederman, Faraone, Mick, Williamson, Wilens, Spencer, Weber, Jetton, Kraus, Pert & Zallen, 1999).

One of the issues raised by the DSM-IV criteria is that the frequency of the behaviour must be considerably higher than in children of the *same mental age*. Braswell and Bloomquist (1991) point out that if there is no discrepancy between a child's cognitive level and their level of inattention, or their level of hyperactivity, then this would preclude A-D/HD. That is to say, that if the child's IQ is two years below their chronological age and their inattention and activity levels are likewise two years below what would be expected for their chronological age, then the child is not A-D/HD, but rather is probably globally developmentally delayed.

## **2.9 DSM-IV Diagnostic Criteria**

The DSM-IV (APA, 1994) describes A-D/HD in the following terms:

Attention-Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity - impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development. (Criterion A)

Some hyperactive - impulsive or inattentive symptoms that cause impairment must have been present before age 7 years. (Criterion B)

Some impairment from the symptoms must be present in at least two settings. (Criterion C)

There must be clear evidence of interference with developmentally appropriate social, academic, or occupational functioning. (Criterion D)

The disturbance does not occur exclusively in the course of a Pervasive developmental Disorder, Schizophrenia, or other Psychotic Disorder and is not better accounted for by another mental disorder (e.g., a Mood disorder, Anxiety Disorder, Dissociative Disorder, or Personality Disorder). (Criterion E)

(DSM IV, p. 78)

The diagnostic features of Attention-Deficit/Hyperactivity Disorder given in DSM-IV are more detailed and wide-ranging than those in DSM-III-R, which makes it more inclusive in terms of possible diagnosis, but there is some concern that the wider variety of symptoms which may be considered could lead to false diagnosis due to failure to properly ascertained frequency and severity for each criterion (Lahey et al., 1994).

Barkley in his 1990 book *Attention Deficit Hyperactivity Disorder*, discusses in detail the implications of the cutoff scores for the then-current DSM-III-R. The cutoff score of eight out of the fourteen symptoms, Barkley reported (on the basis of the DSM-III-R field trials), that this cutoff yielded a 3% prevalence for the 6 to 11 year-old age group. However, the cutoff of eight criteria met was too low to provide a similar prevalence rate for younger children, for whom a score of ten out of the fourteen criteria would better approximate the 3% prevalence, while for older individuals meeting six out of fourteen criteria would be more appropriate for diagnostic purposes (Barkley, 1990, p. 51).

This criticism aside, the general opinion (Barkley, 1996; Edwards & Barkley 1997; Hallahan & Cottone, 1997; Lahey et al., 1994) is that the

DSM-IV diagnostic features are more consistent with empirical findings than those of its predecessors.

This diagnostic perspective is the one which has been adopted most widely in the fields of education, psychology, and medicine. As the DSM-IV diagnostic criteria are currently those most commonly used by practitioners in Australia, this diagnostic scheme has considerable influence over how the diagnosis and treatment of this disorder is conceptualized (NHMRC, 1997).

The DSM-IV diagnostic criteria are accepted as currently the most up-to-date and appropriate by authorities in Australia. The 1996 National Health and Medical Research Committee's report on A-D/HD (NHMRC, 1997) adopted the DSM-IV perspective, as has the, as yet, unpublished Western Australian Cabinet Working Party Report on A-D/HD in its public consultation draft (Western Australian Cabinet Working Party, 1996).

The present Education Department of Western Australia (EDWA) *Behaviour Management in Schools Policy* (EDWA, 1997; 1998) specifies the use of a diagnostic screening tool which explicitly addresses the DSM-IV diagnostic criteria.



## **2.10 Subtypes of Attention - Deficit / Hyperactivity Disorder**

The DSM-IV diagnostic criteria divide Attention-Deficit/Hyperactivity Disorders into three subtypes:

### **314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type.**

This subtype should be used if six (or more) symptoms of inattention and six (or more) symptoms of hyperactive - impulsivity have persisted for at least 6 months. Most children and adolescents with the disorder have the Combined Type. It is not known whether the same is true of adults with the disorder.

### **314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type.**

This subtype should be used if six (or more) symptoms of inattention (but fewer than six symptoms of hyperactivity - impulsivity) have persisted for at least 6 months.

**314.01 Attention-Deficit/Hyperactivity Disorder,  
Predominantly Hyperactive / Impulsive Type.**

This subtype should be used if six (or more) symptoms of hyperactivity / impulsivity (but fewer than six symptoms of inattention) have persisted for at least 6 months. Inattention may often still be a significant clinical feature in such cases.

(DSM-IV, p. 80)

DSM-IV also refers to associated features, which include:

... low frustration tolerance, temper outbursts, ... excessive and frequent insistence that requests be met, mood lability, ... dysphoria, rejection by peers, and poor self esteem. Academic achievement is often impaired and devalued ... In its severe form the disorder is very impairing, affecting social, familial, and scholastic adjustment.

(DSM-IV, pp. 80 - 81.)

In summary, the three subtypes of A-D/HD present in somewhat different ways. The underlying cause, however, remains the same. There have been some suggestions made that the predominantly hyperactive subtype possibly reflects an early developmental stage which later progresses to one of the other forms of the disorder (Barkley, 1995).

In this research the issue of subtypes of A-D/HD will be considered in relation to the perceived Locus of Control of the participants. Data were collected which enabled a decision to be made regarding the subtype which best described each participant. This is discussed as part of the first Research Objective.

## **2.11 Comorbidity Between Attention - Deficit / Hyperactivity Disorder and Other Conditions**

Along with greater clarity of definition, researchers have also recognized the complexity of relationships between A-D/HD, Conduct Disorder, and Oppositional Defiance Disorder. The high reported level of co-morbidity for two or more of these disorders - some reports suggest around 50% overlap or more (Barkley, 1995; Henker & Whalen, 1981), whilst others present results which tend to indicate possibly higher levels of correlation, up to 60% (Prior and Sanson, 1986). When other, non-behavioural psychological or psychiatric problems such as learning difficulties are included, the comorbidity rate rises to approximately 80% in some recent estimates (Adelman & Taylor, 1986; Hazell, 1997; Zubrick, et al., 1995; 1997).

In the light of these findings, there is some question regarding the utility of differential diagnosis, except insofar as it indicates particular intervention strategies for each of these disorders. As the two major strands of treatment; stimulant medication and cognitive behavioural therapy, are used in all three cases, then the assignment of a common designation, such as *Disruptive Behaviour Disorder*, is seen by some researchers as likely to occur in the next few years (Barkley, 1995; 1996).

Thirdly, the issue of comorbid disorders is a major concern for clear diagnosis which then will lead to specific interventions by teachers, psychologists and parents. Although the exact extent of these is beyond the scope of this thesis the evidence which has arisen from the research indicates that a substantial number of individuals who are diagnosed with A-D/HD are also diagnosed as having one or more of: learning difficulties/disabilities, oppositional defiance disorder, conduct disorder, obsessive /compulsive disorder, and depression (Adelman & Taylor, 1986;

Hazell, 1997; Lowe, Cohen, Detlor, Kriminitzer & Shaywitz, 1982; Zubrick, et al., 1995; 1997). There is also developing evidence that there are specific familial or heritable elements to the pattern of disorders which are comorbid with A-D/HD, in particular Conduct Disorder, Major Depressive Disorder, Anti-Social Personality Disorder and Anxiety Disorders in particular (Pffiffner et al., 1999).

All of these have implications for Locus of Control. In particular, if greater internalization of perceived Locus of Control is achieved, then this may lead to an reduction in the severity of the behaviours symptomatic of A-D/HD and other disorders. More effective learning and the perception of reinforcement may also result, leading to more effective functioning for the individual.

## **2.12 Presentation of Attention-Deficit / Hyperactivity Disorder in Two Distinct Settings: Issues of Measurement.**

The DSM-IV Criteria for diagnosis of A-D/HD states, *inter alia*, that “some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).” (APA, 1994, p. 84). Difficulties in obtaining consistent information about these two settings from parents and teachers have been an ongoing source of tension in achieving diagnostic clarity and consensus. One account put it bluntly: “Countless parents have suffered the heartbreak of poor diagnosis” (Jordan, 1992).

The earlier literature shows that there is a strong tendency for parents to report behaviours which reflect hyperactivity, as this is the most noticeable symptom in the home environment. This is particularly true for younger children (Langhorne, Loney, Paternite & Bechtoldt, 1976).

Teachers, on the other hand, have been found to be more likely to refer children on the basis of inattention, rather than other symptoms, although the literature indicates that the difference is not so marked (Croll & Moses, 1985). In a Western Australian study hyperactivity was significantly more often reported (73%) by mothers than any other symptom of A-D/HD (Lewin & Fletcher, 1993). The earlier studies tended to use anecdotal and subjective reports which, given the differences in terminology used by teachers and parents, could present a picture of heterogenous and even contradictory observations.

The demand characteristics of home and school environments differ considerably from one another. At home it is likely that parents are more aware of general activity levels, whilst at school teachers are more likely to focus on structure and task variables (Du Paul et al., 1998). These differences may also depend on other variables such as classroom climate, particularly the match between the actual environment and the student's preferred classroom environment (Fraser, 1991). These characteristics will usually be markedly different from those prevailing in the child's home.

It is likely therefore that if parents and teachers focus on differing aspects of the symptomatology they may disagree quite markedly when asked to describe what they have seen. For the diagnostician this results in a fragmented and somewhat distorted view of the child, as well as causing tension between the teacher and the child's parents.

The differences are much less evident in later research where the data is less dependent on observations and instead relies on the use of rating scales. Recent research found that the factor loadings of mothers' ratings of their A-D/HD children tend to load heavily on impulsivity items of ratings of hyperactive/impulsive symptoms. These findings are seen to be consistent with the *Behavioural Disinhibition model* of A-D/HD (Du Paul, Anastopoulos, Power, Reid, Ikeda & McGoey, 1998). This was particularly

*Scale*. One of the key reasons for the selection of these specific instruments was that they both have equivalent home and school forms which yield results that are comparable (Barkley, 1990; Conoway & Impara, 1995; DuPaul, 1992; Gould, Bird & Jaramillo, 1993; Murphy, Conoway & Impara, 1994). This enables clear comparisons to be made between the two ratings of the behaviours of each participant conducted by separate raters, as well as increasing the diagnostic power of the assessment, as discussed by Power et al. (1998).

## **2.13 Conclusions**

In this chapter it has been shown that A-D/HD is a condition in which the ability of children to attend to and learn from their behaviour is impaired. The impairment arises because of deficits in executive control, particularly *Nonverbal Working Memory, Self-Regulation of Affect, Motivation and Level of Arousal, Internalization of Self-Directed Speech, and Reconstitution* (Barkley, 1998; Barkley & Edwards, 1997).

The effects of the disorder have been shown to be chronic in nature and significantly impairing to the individual across a wide range of circumstances and environments.

The presence of A-D/HD affects overt behaviour, scholastic outcomes, and social interactions. The complexity of the behaviours and the variations seen in behaviours between individuals, which make it more difficult to give a clear and universal description of A-D/HD children, also leads to tensions between teachers and parents who may describe the same child, or behaviour, in different terms, not realising that the behaviours which are quite situation specific spring from a single underlying cause.

The tensions between teachers and parents have been exacerbated by

practitioners' and researchers' reliance on anecdotal records or subjective descriptions rather than the use of standardised measures of specified, observable, behaviours, with parallel forms for home and school settings. The move towards the use of such standardized measures has been advocated by practitioners and was a recommendation of the NHMRC Report on A-D/HD (NHMRC, 1997).

The diagnosis of A-D/HD has become increasingly refined in the last three decades and there is now broad agreement regarding the observed symptoms and their significance in reaching an appropriate diagnosis. Care needs to be taken to establish the severity of symptoms across relevant environments and situations. This requires the use of effective measures which allow directly comparable ratings to be gathered from raters who often have very different views of the child, namely their parents and their teachers.

The researcher sees the establishment of a common framework for assessing and describing behaviours for both teachers and parents to be a major development, one which will be returned to in later chapters of this thesis.

Over many years the conceptualization of the disorder has evolved greatly since the beginning of this century, from being ascribed to brain injury or lack of moral judgement, to a genetically transmissible neurochemical disorder which seriously impairs the individual's ability to recognise, reflect upon, and then react to events in an appropriate manner.

The major treatment strategies for A-D/HD at present are medication, usually psychostimulants, although others such as tranquilizers are also prescribed, and the use of cognitive-behavioural interventions. There is support in the literature for the position that the optimal intervention is one which combines both of these approaches in a program tailored to the

individual's needs (Barkley, 1990; 1995; Braswell & Bloomquist, 1991; Newby, Fischer & Roman, 1991; Northup et al., 1999; Rapport, 1983).

Having reached this point, we must now consider the concept of Locus of Control, its rôle in effective learning, and the implications of A-D/HD for perceived Locus of Control of children.



## **Chapter 3**

### **Locus of Control**

Locus of Control is conceptualised in the literature as the degree to which an individual perceives the causes of events to be attributable to factors and forces that are external to the individual, or are within the individual (Chaplin, 1985). One of the major external environmental factors in human behaviour and learning is the reinforcement of behaviour.

The extent to which an individual actively perceives that received reinforcement is contingent upon their own behaviour, skills, or other attributes is an indication of internal Locus of Control. The degree to which an individual has a perception of an external or internal Locus of Control will, therefore, influence the extent to which reinforcement from a given source is effective for that individual. Perceived Locus of Control is thus a significant concept in our understanding of individuals who fail to learn the accepted social and cognitive norms of their context.

The concept of Locus of Control derives from the social learning theory developed in the nineteen fifties and sixties by a number of workers, notably Julian Rotter (1954; 1960; 1966), and Albert Bandura (1977;

1986; 1995; 1997). Although the concept was originally developed more than forty years ago, perceived Locus of Control still continues to be of interest to psychologists and educators to the present time, with studies focussing on Locus of Control in specific populations and situations such as academic underachievers (Trusty, 2000), choice behaviour and health beliefs (Berg, Jonsson & Conner, 2000), children with self esteem issues (DeMello & Imms, 1999; Post, 1999), bullies and their victims (Andreou, 2000; Sandstrom, 1999), interpersonal problem solving and cognitive styles (Bernstein, 1999; MacGregor 1999; Mukhopadhyay & Dash, 1999), preventative and responsive programs to child sexual abuse (Caper, 1999; Dumont, Hebert & Lavoie, 1999), children with language delays (Carson, Perry, Deifenderfer, & Klee, 1999), children in stressful situations (Hallis & Slone, 1999, Kilpatrick & Williams, 1998), children and adolescents diagnosed with depression (Haas, 1999).

In areas directly relevant to the present study, studies have been published in the last two years involving perceived Locus of Control in the action-control beliefs of children and their relationship to school performance (Little, Stetsenko, & Maier, 1999), aggressive behaviour (Halloran, Doumas, John & Margolin, 1999; Oesterman, Bjorkqvist, Lagerspetz, Charpentier, Caprara & Pastorelli, 1999), responsibility for behaviour (Powell & Rosen, 1999) and children diagnosed with A-D/HD (Rucklidge, 1999).

It is also worth considering another, more recently developed perspective on attributions of causality, that of Dweck. Dweck (1998), summarized the findings of over a decade of studies into patterns of belief in learned helplessness. Dweck identified distinct patterns of behaviour characterising mastery-oriented and helpless children on the basis of their responses to failure.

The “helpless” children tended to ruminate on the reasons for their

failure and to ascribe them to factors within themselves that they felt they couldn't overcome. The "helpless" children tended to define themselves by their failure and to seek excuses for their failure. They did not persevere with problem-solving strategies and tended to downplay previous instances when they had been successful.

The "mastery-oriented" children, by contrast, focussed on developing solutions to problems at which they failed (i.e., similar to an internal perceived Locus of Control). The "mastery-oriented" children's reaction to failure was to increase their efforts and to refine their problem solving strategies (Dweck, 1998; Dweck & Leggett, 1988)

It is evident that children's beliefs about the causal sources of success and failure are an important variable in seeking to improve their educational and social outlook. The next section of this chapter will discuss the construct of Locus of Control in the context of the theoretical basis within which it was developed.

### **3.1 Social Learning Theory and Locus of Control**

Social learning theory attempts to explain the person's selection of specific responses from a larger repertoire in predicting behaviour in social settings (Autry & Langenbach, 1985, p. 76). Within the social learning theoretical framework Locus of Control is conceptualised as the degree to which an individual perceives the causes of events to be due to factors that are external or internal to the individual. Individuals with an internal Locus of Control believe that the reinforcements they receive

largely result from their own decisions, behaviours, abilities, effort, or other characteristics. Those individuals with an external Locus of Control believe that most events can be attributed to actions of other people or organisations, chance, or luck, rather than to their own attributes (Chaplin, 1985; Rotter, 1982).

Locus of Control has been studied extensively as a part of social learning theory for four decades, with the construct originally being described by Julian Rotter in 1954 (Rotter, 1954; 1966) and subsequently developed by Rotter and other researchers including Bandura (1977), Bandura & Walters, (1963), Phares (1957; 1973; 1976), Lefcourt (1982), Nowicki and Strickland (1973), and Weiner (1986). Locus of Control has become a key concept in understanding the reactions of people to their environment and their behaviour and is supported by a comprehensive literature in social psychology.

Rotter, in a review of the literature, described the interest of early social - learning theorists in developing a quantifiable view of Locus of Control:

Our interest in this variable developed because of the persistent observation that increments and decrements in expectancies following reinforcement appeared to vary systematically, depending on the nature of the situation and also as a consistent characteristic of the particular person who was being reinforced.

(Rotter, 1982, p. 266)

Rotter was particularly interested in whether Locus of Control was a variable which might have predictive power with regard to the effects of reinforcement on expectancies. Subsequent research has confirmed that the predictive power of Locus of Control on the effectiveness of

reinforcement in changing behaviour is quite substantial (Campbell, 1976; Mirels 1970; Phares, 1973; 1976; 1978).

Many descriptions of Locus of Control, particularly during the nineteen-fifties and sixties tended to give the impression that it is a fixed quantity, a trait, or a personality type, which is relatively unchanging (Prior, 1991). The use of the terms 'internal' and 'external' as descriptions of individuals underlines this impression. In fact the perception of Locus of Control varies markedly across time for most people, as described by Lefcourt in his comprehensive review of Locus of Control research:

An individual's locus of control is often inferred from momentary expressions of his sense of causality which, if solicited at different points in time, may be relatively consistent. However, it must be kept in mind that empirical events such as expressions of causal expectations are but referents of the locus of control construct and not the construct itself.

(Lefcourt, 1982, pp. 148 - 149.)

Lefcourt continues by describing Locus of Control as a construct by which people interpret events around them, particularly the causation of the events. The individual's construct of Locus of Control is both stable and changeable: it does not change frequently but it does change to accommodate events which affect their expectancies of control. This finding was echoed in a 1990 study which found that the correlation was highest between Locus of Control scores and short term expectancies (accounting for 20.7% of the variance), rather than with long term expectancies, or with permanent feelings of non-control (Boone, Brabander, Gerits & Willeme, 1990).

More recent studies view perceived Locus of Control as a perception of

the “self as a controller of outcomes” to a greater or lesser extent. These are seen as being less permanent than in the past and are, to some extent, more situationally specific than was previously thought (Bandura, 1995; Bandura 1997, Weiner, 1986). Bandura’s position on Locus of Control is well summarized by the following quotation:

Beliefs that outcomes are determined by one’s own behavior can be either demoralizing or empowering, depending on whether or not one can produce the required behavior. People who regard outcomes as personally determined, but who lack requisite skills, would experience a low sense of efficacy and view the activities with a sense of futility. Thus, for example, children who lack understanding of arithmetic concepts and expect their course grades to depend entirely on the quality of their mathematical performance have every reason to be demoralized. It is when people have the efficacy to perform well that belief that outcomes are dependent on their actions will create a sense of causative power.

(Bandura, 1997, p. 20.)

Schneewind (1995) considers a number of these beliefs about the individual’s control over outcomes: *Personal Agency Beliefs*, *Perceptions of Control*, *Control Beliefs*, *Contingency Judgements*, and *Competency Judgements*, to be “theoretically similar, but differently labelled” (p. 116) variations on the original conception of Locus of Control. These variations can be seen to be labels for Locus of Control which vary with the context of the behaviour being considered in each instance.

As a result of these developments, Locus of Control is presently seen as the immediate, or situation specific, application of an individual’s overall self-efficacy. Perceived Locus of Control may vary for each individual depending upon the forces – such as environment, past experience with

similar events, and general perceptions of personal control – that are perceived to be operating in those circumstances, to a greater extent than was posited in earlier conceptions of attribution theory (Bandura, 1995; 1997; Schneewind, 1995).

The implication for the present research is that perceived Locus of Control may be a reflection of generalised expectancies for controlling outcomes, but that it varies much more according to circumstances than was previously believed. The generalizability of an individual's perceived Locus of Control between settings and over time can, and according to recent findings (Bandura 1995; 1997) does, vary over time. Influencing the individual's perceived Locus of Control in one environment may not, therefore, affect their perceived Locus of Control in all settings.

Although the specificity or otherwise of the settings may be the subject of some dispute it is likely that settings such as “the school classroom” and “the school playground” may well be considered to be specific, relatively narrow settings. They are, however, temporally and psychologically dominant for school aged children and they tend to be relatively stable over periods of several months.

The next issue that must be considered is what evidence there is for systematic change in perceived Locus of Control in children, and then, whether the change can be directed or managed through interventions.

### **3.2 Development of Perceived Locus of Control**

A major thread in the research into perceived Locus of Control has been the way in which it changes during childhood and adolescence. Numerous

studies have focussed on the development and change in Locus of Control in childhood, showing generally increasing internality with age and cognitive development.

This development was shown by Penk, whose results demonstrated there was a significant relationship ( $r = .27$ ,  $p < .01$ ) between scores on the Bialer Locus of Control scale (Bialer, 1961) and mental age, assessed by capacity for verbal abstraction as measured by the Peabody Picture Vocabulary Test (Penk, 1969, p. 856). This result is consistent with our understanding of the general development principle that with increasing cognitive development and sophistication the individual can be expected to be able to increasingly recognise the control that he or she is able to exert over the environment and their own behaviours.

That this is not always so is demonstrated in a meta-analysis by Weisz and Stipek (cited in Lefcourt, 1982), who reported that of the 33 studies they examined, approximately half found increasing internality with age. Their conclusions were that although in some cases the results may be due to problems with the measurement of the construct or with confounding variables, the individual experiences of particular children may well have a profound and lasting effect on their perception of control and their ascription of causality and feelings of control. Attributing causation to external forces can be a pervasive coping mechanism for them in dealing with painful or potentially discouraging stimuli (Lefcourt, 1982).

There have been a large number of studies that have found that children's learning was more rapid and that their behaviour changed in the desired direction (i.e. improved) when they perceived that they controlled the occurrence of reinforcement (Goodnow & Pettigrew, 1955; Mussen, Conger & Kagan, 1974; Rotter, 1966; Saks, 1988; Tiggemann & Crowley, 1993; Wyckoff & Sidowsky, 1955).



In one study when children considered that the task they were provided with could only be performed by guessing, or that success was not under their control, their performance degraded, as one would expect from the general principles governing the effects of perceived Locus of Control. (Pierehumbert, Plancherel & Meuwly-Chaud, 1987).

Results such as these reflect those of a much earlier study by Phares in which participants who were told that skill (a controllable variable) influenced their performance on a difficult task tended to be more internal than the group which was told that the outcome was based on luck (an uncontrollable variable). The participants in the skill condition (i.e., those who believed they largely controlled the outcome) responded to reinforcement much more consistently than did those in the luck condition (Phares, 1957).

In a major monograph on research into Locus of Control, Rotter summarised the early attempts to develop measures of generalized expectancies of external control which started with Phares in 1957 (Phares, 1957; Rotter 1966). In the context of assessing developmental changes in perceived Locus of Control, Bialer described the results of a study assessing the perceived Locus of Control of children (Bialer, 1961).

In that instance the instrument was developed and employed to evaluate differences in perceived Locus of Control between “mentally retarded” and “normal” children. The children completed tasks where they were told that they had a time limit in which to complete a puzzle. In fact the “success” and “failure” conditions were manipulated experimentally. Each child then completed the Rotter Locus of Control questionnaire (Rotter, 1966).

Bialer’s results indicated that there was a significant correlation between increasing internality and mental age ( $r = .56$ ,  $p = .01$ ), and that mental age “is the more relevant developmental variable”, given that factor

analysis showed mental age to be the single most important factor, with chronological age being a somewhat less important loading (Bialer, 1961, pp. 313 - 315).

The general conclusion that Bialer drew from these results was that cognitive development was the most salient factor of those examined in relating to increasing internality of Locus of Control. That this is a refinement of the belief that perceived Locus of Control will become more internalizing with age is reasonably obvious, but it also implies that the rate of cognitive development, and indeed the highest level of cognitive development attained by an individual, will have a significant bearing on the eventual level of internality or externality of perceived Locus of Control that the individual achieves.

It is interesting to speculate further on this, that it may also be the case that cognitive development and internality of perceived Locus of Control covary to some extent and that if perceived Locus of Control is developed, perhaps the rate of cognitive development might be increased. The researcher has found no literature to support this hypothesis, but it could perhaps be fruitfully pursued in the future.

Subsequent to the publication of Bialer's research, Battle and Rotter (1963) published an instrument which used simple pictures to measure the Locus of Control of younger children, the Children's Picture Test of Internal-External Control. In part this was to provide a measure that was less cognitively demanding and therefore more appropriate for children in the 5 - 8 years of age bracket. The specific context of the instrument, which was to attempt to ascertain whether children of different ethnic groups (Negro and non-Negro) varied consistently in their perceived Locus of Control, meant that this was not particularly useful in more general contexts (Battle & Rotter, 1963; Dixon, McKeel & McRae, 1976; La Montagne & Hepworth, 1991; Lange & Tiggenmann,

1981; Layton, 1985; Lefcourt, 1982).

In his 1966 monograph Rotter presented a somewhat more refined and detailed measure of children's perceived Locus of Control, consisting of 29 items that were found (by means of Factor Analysis) to assess the degree of generalised perceived Locus of Control of an individual with reasonable precision. A number of groups had been administered the scale, ranging through undergraduate psychology students, high school students, prison inmates, and Peace Corps trainees, who recorded significantly more internal scores than the other groups.

On the basis of these results, and those of other studies up to that time, Rotter hypothesized that social class and cultural values have an association with Locus of Control, with internalisation being associated with higher social class (Rotter, 1966; Nowicki & Strickland, 1973). This finding has implications for the assessment of children's perceived Locus of Control, and was a potentially confounding factor that was controlled for in the present research. This issue, therefore, will be discussed in detail in chapter five of this thesis.

The publication by Nowicki and Strickland of their *Locus of Control Scale for Children* (CNS-IE) represented a major step forward in the measurement of Locus of Control in older children and adolescents. The scale consists of 40 yes / no questions, the purpose of which is to "provide a reliable, methodologically precise measure of generalized locus of control of reinforcement that could be group administered to a wide age range of children" (Nowicki & Strickland, 1973, p. 149). The CNS-IE investigates reinforcement attributions across a variety of situations, including dependency, achievement and affiliation (La Montagne & Hepworth, 1991, Lefcourt, 1982).

The CNS-IE remains the single most widely used scale for measuring the Locus of Control construct in children and adolescents (La Montagne &

Hepworth, 1991, p. 70) and has been used extensively from 1973 to the present time in Australia and elsewhere to measure the Locus of Control construct (Gomez, 1997; Kilpatrick & Williams, 1998; O'Brien, 1980; Ralph, Merralls, Hart, Porter & Su-Neo, 1995; Spillane, 1980).

After the publication of the CNS-IE, Nowicki and Duke (1974) developed a preschool and primary adaptation, the PPNS-IE, for use with younger children. As with the CNS-IE the PPNS-IE has been widely reported to have good psychometric properties, particularly with regard to reliability. In their review of measures of Locus of Control, La Montagne and Hepworth cite reliability coefficients of between .63 and .81 for the CNS-IE and .79 for the PPNS-IE (La Montagne & Hepworth, 1991, p. 70).

The reliability of measurement of the CNS-IE is extremely important since it enables the researcher to reach firm conclusions regarding the effectiveness of an intervention in changing the Locus of Control of participants, allowing the presumption that the change in perceived Locus of Control has been due to the effect of the intervention.

These studies provide clear support for the position that age is not the only variable which impacts on perceived Locus of Control. Indeed the research supports the contention that age is a relatively minor factor in the development of internal perceived Locus of Control. Factors such as cognitive maturity, explicit beliefs and attributions, socio-economic status, and cultural variables appear to be significant in perceived Locus of Control (Bandura, 1986; Bandura & Walters, 1963; Boone, Brabander, Gerits & Willeme, 1990; Graham, 1997; Lefcourt, 1982; Tiggemann & Winefield, 1984).

Even in adulthood perceived Locus of Control is not static and can be influenced temporarily by events. In one study in which clients with neuropsychiatric crises attended a crisis intervention clinic, the perceived Locus of Control of the clients treated became significantly more internal

following treatment at the clinic, while for non-crisis clients their perceived Locus of Control varied insignificantly across the same timeframe (Smith, 1970). These results also indicate that perceived Locus of Control is amenable to therapeutic intervention, with improved outcomes for clients achieving greater internality of perceived Locus of Control, a finding also reported by Foon (1987).

The significance of internality of Locus of Control has been illustrated most forcefully in Bruno Bettelheim's descriptions of the psychology of concentration camp and GULAG inmates. Those inmates who believed that, at least in part, they had control over their fate survived, whilst those who believed that their fate was not under their control (i.e. had an external perceived Locus of Control) rapidly succumbed (Bettelheim 1960, p. 268).

The individual's perception of freedom of movement is central to the concept of Locus of Control. Within the framework of social learning theory, an individual's actions are predicated on the basis of his or her expectations, values, and the situation, or situations, involved. Expectancies are given equal weight to values, as are situations (Rotter, Chance & Phares, 1972).

Rotter attempted to identify the relevant variables in this context and to develop a model which would enable predictions about behaviour to be made.

The potential for a behaviour, or behaviours, to occur is a function of the person's expectancy that the behaviour will lead to reinforcement; and the strength of the value of the reinforcement to that person. Conversely, when an person has little or no expectation that their behaviour will precipitate positive outcomes, the behaviour is unlikely to be repeated in a systematic way.

The concept of *Freedom of Movement* is pivotal to the model of Locus of Control both in the perception of control over outcomes in specific situations as well as for outcomes more generally: “*Freedom of Movement* is a generalised expectancy of success resulting from man’s ability to remember and reflect upon a lifetime of specific expectancy – behavior – outcome sequences” (Lefcourt, 1982, p. 33). When the capacity for reflection is diminished, so too are the perceptions of control over one’s life and actions.

The perceived control the individual possesses is a generalised expectancy for internal control of reinforcements, as opposed to an external control. This is an abstraction derived from a series of specific expectancy – behaviour – outcome sequences, but involving analysis of the causes of success or failure (Rotter, 1966, p. 2). Perceived control is a generalised expectancy of internal or external control that varies between individuals and also within the individual depending on their experiences and the interpretation they place upon them.

From this, social learning theory hypothesises that the expectancies of an individual who does not see the reinforcement as being contingent on *their* behaviour are much less likely to be influenced by the presence or absence of the reinforcer than would those of an individual who does realise that contingency exists. The theory also indicates that the degree to which individuals are aware of these contingencies is a continuum, rather than a pair of polar states (Rotter, 1960; 1966). This means that changing the perception of control involves movement along the continuum, rather than effecting an absolute change in the perception.

The individual’s beliefs regarding the nature of the causal relationship between their behaviour and its consequences will necessarily affect a wide variety of behavioural choices. The expectancies and the value the individual places on the reinforcement will result in differences between individual’s behaviour in given circumstances.

Rotter points out that this effect does not occur in games of chance and comparable situations, where what is termed *the gambler's fallacy* has the reverse effect; response is increased because one believes that eventually one *must* win, or alternatively, if one is winning that 'one's luck must run out'. This represents a belief that there is an orderliness to the situation where there is in fact no orderliness or control over the outcomes by the participant. If the individual perceives that they do not have control over the situation, but that the occurrences are due to chance, then the expectancy of success, or winning, for example, is typically reduced (Phares, 1957; Rotter, 1966; 1982).

The individual's expectancy that they will be able to learn and apply rules is another significant aspect of their functioning that will be dependant, at least in part, upon the perceived Locus of Control. It will also be dependant on the individual perceiving the relationship between their behaviour and its consequences - that is the feedback experiences that occur as a result of the behaviour.

Individuals formulate rules on the basis of observation, experience, and instruction:

When rules defining appropriate behaviour are not explicitly designated, they are derived from information conveyed by observed or experienced response consequences. Provisional hypotheses that produce responses resulting in favourable outcomes are retained, partially correct hypotheses are successively refined on the basis of differential response feedback until the right one is hit upon, and erroneous hypotheses that give rise to faulty

performances are discarded. While it is true that implicit rules govern behaviour, the rules themselves are partly fashioned from feedback experiences.

(Bandura, 1977, p. 188)

Since the construct of perceived control is explicitly dependent on the perception of outcomes being the result of the individual's own actions, if they are not so perceived they are not effective in altering the way in which the individual views situations and consequently alters future behaviour. The following quote from the introduction to Julian Rotter's 1966 monograph provides a clear statement that this perception directly affects the value of a reinforcer:

As an infant develops and acquires more experience he differentiates events which are causally related to preceding events and those which are not. It follows as a general hypothesis that when the reinforcement is seen as not contingent upon the subject's own behaviour that its occurrence will not increase an expectancy as much as when it is seen as being contingent. Conversely, its nonoccurrence will not reduce any expectancy so much as when it is seen as being contingent.

(Rotter, 1966, p. 2)

### **3.3 Planned Changes in Locus of Control**

If children who have an internal perceived Locus of Control learn more effectively than do children who have an external perceived Locus of



Control, then it is important to consider the question of whether perceived Locus of Control can be intentionally changed in the direction of greater internalisation. The question then arises as to whether this would then lead to greater functionality for these individuals, in academic, social, and occupational settings?

Several training programs for developing self-control and self-awareness have been published. One of these programs is described in detail by Herbert (1987). The program is intended for use in a classroom setting, conducted by the teacher or another suitably trained and experienced adult. The purpose of the training is to increase the level of control the child exercises over his or her behaviour and their body movements.

The program which Herbert describes uses a progressive series of exercises coupled with self-directed talk, the purpose of which is to develop awareness of the targeted behaviours and their consequences. As a result of mastering these skills there is increased management of the behaviours by the child based on their awareness and self-reinforcing talk which not only reinforces the behaviour but also generates the perception of internal control (Herbert, 1987).

This use of self-reinforcing and self-monitoring behaviours provide methods which assist the subject in learning and internalizing rules for behaviour in specific settings. The aspect of the training which appears to be most important is making the subject aware of the onset of the antecedent behaviours. The attentional aspects of this process are clearly and directly derived from the early work of Bandura and Rotter (Herbert, 1987; 1991).

A further example of a detailed classroom intervention that focusses directly on developing internalization through self-regulation and self-awareness was developed and described by Edward Workman (1982). The explicit aim of the program is to provide a behaviour - management

intervention with desirable features:

In addition to being cost-effective, behavioral self-control technologies provide students with skills that will be useful throughout their lives. These skills will enable students to function as independent, self-managed adults, who can use their own resources to cope with life's demands.

(Workman, 1982 p. vii)

These aims are consistent with the rôle that Bandura sees for the self-perception of an internal perceived Locus of Control in the development of a functional, self-directed individual (Bandura, 1995; 1997).

Workman's intervention consists of *self-assessment*, *self-monitoring* and *self-reinforcement*. Using methods provided by an instructor (usually the class teacher) the participants learn to effectively evaluate and guide their own behaviour. The participants monitored their behaviour and its changes over time, while they positively reinforced themselves for engaging in appropriate behaviours. The choice of reinforcer was made largely by the participants themselves (Workman, 1982, pp 18 - 26).

Workman found that self-reinforcement of appropriate target behaviours markedly assisted students in increasing the frequency and duration of the target behaviours and also in increasing the accuracy of participants' judgements regarding their success in developing and maintaining the desired behaviours. Workman relates that this approach "tends to foster an internal Locus of Control and therefore represents a means of teaching "self-responsibility"" (Workman, 1982, p. 90).

A similar approach to developing more internal control is also used in the *Stop, Think, Do* program (Petersen and Gannoni, 1992; 1994). This Australian intervention, run over six or more sessions has modules that

include training in providing cues for self-talk and self-monitoring of target behaviours. As *Stop, Think, Do* was the intervention used in this research, it will be discussed in greater depth in the next two chapters of this thesis.

In each of these interventions the core of the techniques used to develop improved behavioural functionality is the self-awareness modification of the individual. This is dependant also upon the awareness of the individual and their realization of their control over their behaviour (Herbert, 1987; 1991). The extent to which that realization is achieved will directly influence the ability to change the individual's perceived Locus of Control.

It is readily apparent, therefore, that for those individuals who have a range of dysfunctional behaviours there will be a reduced level of self-awareness. Effective interventions for individuals diagnosed with A-D/HD will require treatments or components that develop self-awareness as well as ones intended to develop more functional behaviours. The components which develop self-awareness must address the issues of choice and correctly interpreting stimuli received from the physical and social environment in order to be effective. In the case of individuals who have A-D/HD this should recognise the specific characteristics and deficits associated with the disorder.

Another technique which has been used to effect change in perceived Locus of Control is the use of biofeedback, a technique in which the subject is made aware of action potential signals occurring in, for example, motor neurons, by converting the signals to a detectable form, usually sound or light. Once aware of these signals, the subject can then be trained to control them through conscious effort to do so (Groves & Schlesinger, 1979. p. 306).

There have been many studies published which have examined the

effectiveness of biofeedback in developing greater internality of perceived Locus of Control, including several (Denkowski & Denkowski, 1984; Denkowski, Denkowski & Omizo, 1983; Denkowski, Denkowski, & Omizo, 1984; Omizo, 1980) where children diagnosed with A-D/HD were the subjects. Overall, these studies found that biofeedback training generally did result in increased internality for most of the subjects. It is interesting that these studies were published in the nineteen-eighties, but there has been little or no more recent published research in this area. Further research in this area comparing the effectiveness of cognitive - behavioural interventions and biofeedback could be quite fruitful. The demonstration of the individual's ability to control muscular activity could well be a first step in developing a belief system that focusses on their ability to control their behaviour and the consequences of their behaviour.

### **3.4 Locus of Control and Attention - Deficit / Hyperactivity Disorder**

At this point it is important to reconsider the following questions, originally raised in chapter one, in the light of the literature on both A-D/HD and on Perceived Locus of Control:

- 1 What is known about the extent to which individuals with A-D/HD make attributions of causation for their behaviour, and the direction of their attributions?
- 2 By examining the literature can we gain a better understanding of the implications of A-D/HD for perceived Locus of Control?
- 3 How can we use this understanding to develop better management

strategies for individuals with A-D/HD?

In the case of individuals with A-D/HD their expectancies are likely to be influenced by difficulties in identifying these relationships. With a limited capacity to perceive and reflect on contingent relationships, it seems probable that individuals with A-D/HD will be less successful in modifying their behaviour in response to its consequences.

The *Behavioural Disinhibition model* of A-D/HD hypothesises that four major factors are implicated in the condition, *Nonverbal Working Memory, Self-Regulation of Affect, Motivation, and Level of Arousal, Internalisation of Self-directed Speech and Reconstitution*. At least two of these impact on the capacity to learn from one's behaviour – *internalization of language and prolongation* (Edwards & Barkley, 1997, pp. 14 - 16).

*Internalisation of Self-directed Speech* affects the individual's projections regarding the future and their control over courses to be taken by means of translating rules, or the realization of consequences, into actions which are consistent with those rules.

*Nonverbal Working Memory* refers to the delaying of response to permit reflection and analysis on an event so the most appropriate response can be made. Lack of this ability generally results in the loss of explicit connections between behaviour and consequences.

*Reconstitution* refers to the analysis and synthesis of concepts and processes, verbal fluency and goal directed creativity.

Individuals with A-D/HD will, therefore, have a limited perception of outcomes as being the result of their own behaviour and attribute causation to external agency. They are thus unlikely to develop appropriate behaviours, or strategies that will assist them in developing

the appropriate behaviours in the future. The answer to the first question posed at the beginning of this section is, therefore, that individuals who have A-D/HD are likely to be less aware of causation, and when they are aware, would tend to attribute causation to external agency, demonstrating an external perceived Locus of Control.

The answer to the second question posed at the beginning of this section; *By examining the literature can we gain a better understanding of the implications of A-D/HD for perceived Locus of Control*, is that to date there has developed only a small literature examining the effects of A-D/HD on perceived Locus of Control. To the present time there has been no exploration of the possibility of changing perceived Locus of Control in the direction of increased internality in order to effect improvements in the self-regulation and self-management of behaviour of children with A-D/HD in this literature.

In the earliest publication to address both A-D/HD and Perceived Locus of Control, Bugental, Whalen and Henker (1977) reported the results of a study in which the causal-attributional styles of A-D/HD boys were predicted to act as differential mediators for two widely differing behavioural interventions: Positive self-talk and contingent social reinforcement.

The stimulant medication status of the subjects was also manipulated experimentally, with half of each group being medicated, the other half unmedicated.

The results of the study indicate that the participants with higher internal perceived Locus of Control did better with the self-talk approach, whilst those with less internalised perceived Locus of Control (i.e., more externalising) performed better under the social reinforcement régime. The externalising subjects performed better when being externally reinforced, which would not be unexpected on the basis of the literature

on perceived Locus of Control.

A subsequent paper that presented a two year follow up of the original participants, with the results that the group for whom self-talk had been more successful originally reported an increased perception of personal control. In contrast, the group who were more externalising and for whom social reinforcement had been more successful in the immediate term were, on the other hand, found to have retained a greater improvement in teacher reported hyperactivity and impulsivity behaviours.

The paper also noted that on a qualitative measure of impulsivity (the Porteus Mazes test) both groups had maintained their improvement. These results were an early indicator that, given an appropriate setting and intervention, changes to A-D/HD children's behaviour could be more effectively achieved through tailoring a program to match the level of externality of their perceived Locus of Control (Bugental, Collins, Collins, & Chaney, 1978).

More recently a study found that A-D/HD boys tended to be more externalising in ascribing causes for their failures than were members of a control group. However, the study also found that they tended to be more internalising than the control group when it came to attributing their successes in social situations. The researchers hypothesized on the basis of these findings that this pattern of beliefs may well be face-saving for A-D/HD participants in light of their generally poor level of academic functioning and that it is an ego-defensive strategy to attribute failure to external causes (Hoza, Pelham, Milich, Pillow & McBride, 1993, p. 281). The study concluded with a recognition of the need for further research into the perceptions of perceived Locus of Control by children and adolescents with A-D/HD.

Perceived Locus of Control was identified as a potentially important

factor in the personality of individuals with A-D/HD in studies by Linn and Hodge (1982) and Lufi and Parish-Plass (1995).

In each of these studies the higher level of externality found in children with A-D/HD was hypothesised by the authors to be due to the use of stimulant medication in the management regime, leading the children to feel that they bore no responsibility for their behaviour. Alternatively, a child with a pre-existing externalized perceived Locus of Control could interpret their use of psychostimulant (or other) medication as further evidence of the individual's inability to exercise self-control.

Both of these studies used Nowicki and Strickland's CNS-IE (Nowicki & Strickland, 1973) to measure the perceived Locus of Control of the participants.

The earlier study found that there were significant differences between the means of scores on the CNS-IE between the A-D/HD participants and their control group with the A-D/HD participants having the more externalized perceived Locus of Control than the control group (Linn & Hodge, 1982, p. 593).

In the other study, Lufi and Parish-Plass (1995) found that the mean score for perceived Locus of Control of the A-D/HD children they assessed on the CNS-IE was significantly greater (more external) than that of non-A-D/HD children (p. 97). Lufi and Parish-Plass did not, however, further pursue major issues by examining other key variables, such as behavioural difficulties, subtypes of A-D/HD, or the effectiveness of the particular management régime being implemented for the individual participants in the study.

Although both of these studies identified an external perceived Locus of Control as a characteristic of A-D/HD boys and also demonstrated that their level of externalization is higher than that of their non-A-D/HD



peers, neither study examined the possibility of changing the perceived Locus of Control of the participants in the direction of greater internality.

The studies by Bugental et al. (1977; 1978), found that different types of interventions were more effective for children with an internal perceived Locus of Control as opposed to a external perceived Locus of Control. These studies did not, however, address the issue of changing children's perceived Locus of Control, nor the effect that such a change might have on the behaviour management and social development of those A-D/HD children who have an externalized perceived Locus of Control. In answer to question three posed at the beginning of this section; *How can we use this understanding to develop better management strategies for individuals with A-D/HD*, the presently accepted and recommended intervention strategies for A-D/HD, stimulant medication and cognitive-behavioural interventions, (NHMRC, 1997) only address the phenomena of *Hyperactivity, Impulsivity, and Inattention*.

These interventions address behaviours that are seen by parents, teachers and physicians as inappropriate, harmful, and disruptive. This attitude is then extended to the perception of the individual who is exhibiting the behaviour.

Because these strategies are tied to reducing specific behaviours they are unlikely to encourage the development of positive behaviours, or to generalize to other situations. This criticism has been levelled at the predominant intervention strategies on numerous occasions (Abikoff, 1987; Brown, Wynne & Medenis, 1985; Carlson, Pelham, Milich & Dixon, 1992; Douglas, Parry, Marton & Garson, 1976; DuPaul & Barkley, 1993; Evans & Pelham, 1991; Hinshaw, Henker & Whalen, 1984; Jarman, 1992; Northup, et al., 1999; Robinson, Smith, Miller & Brownell, 1999; Whalen & Henker, 1991; Whalen, Henker & Hinshaw, 1985)

The researcher believes that the use of cognitive-behavioural

interventions that have been specifically developed to effect change in the perceived Locus of Control of boys, particularly those with A-D/HD, in the direction of greater internalization are the most appropriate behavioural interventions to employ in these circumstances. Cognitive - behavioural interventions that address these issues are more likely to have a greater effect on the boys' behaviour and will lead to longer term benefits for their behaviour and their mental well-being.

This thesis represents an original examination of the ability of individuals with A-D/HD to shift their perceived Locus of Control in the direction of greater internalization. It will also examine the proposition that an appropriate cognitive behavioural intervention can be employed with A-D/HD individuals to effect change in their perceived Locus of Control.

The demonstration of success for such an intervention will have implications for the effective management of the behaviour of children with A-D/HD in schools, potentially leading to the more efficient use of resources by teachers, school psychologists and others. This also has implications for parents' management of A-D/HD children in the home environment and better understanding between home and school.

## **Chapter 4**

### **Psychometric Aspects of the Research Program**

It is fundamental to the integrity of the research activity that the operational implementation of the key variables, A-D/HD and perceived Locus of Control, is achieved effectively. In the research program of this thesis, the key variables examined are the presence and magnitude of attentional deficit of the participants, the quality of the cognitive – behavioural intervention program that constitutes the intervention and the determination of perceived Locus of Control at various points in the program.

In this chapter the operational definitions of these three important variables are provided within the cognitive – behavioural conceptual framework for the study. The instruments associated with the measurement of the variables, Attentional Deficit and perceived Locus of Control, are described and their psychometric characteristics evaluated. Further procedures to provide confirmatory evidence of the suitability of the selected instruments are also outlined. Justification is given for the choice of the *Stop, Think, Do* program as an exemplar of cognitive – behavioural interventions, and evidence of its applications elsewhere is reviewed.

## **4.1 Instruments and Intervention**

Two A-D/HD instruments were used to determine the presence and magnitude of Attentional Deficit in the participants who participated in this research. Both of them are in general use in schools, clinics, and private practices in Western Australia for the diagnosis and measurement of A-D/HD. The instruments are: *The Attention Deficit Disorders Evaluation Scale* (ADDES) (McCarney, 1989; 1989a) in both the home and school forms; and the *Child Behavior Checklist* (CBCL) (Achenbach, 1991), and the associated school form of the instrument, the *Teacher's Report Form of the Child Behavior Checklist* (TRF-CBCL) (Achenbach, 1991a).

The use of these standardised instruments is consistent with the literature on screening and diagnosis of A-D/HD in school settings (August, Ostrander & Bloomquist, 1992; Barkley; 1990; Boyle & Jones, 1985; Edelbrock & Costello, 1988; Luiselli, 1991; Mattison, Humphrey, Kales & Wallace, 1986; Milich & Fitzgerald, 1985; Piffner & O'Leary, 1993; Sattler, 1992; Wolraich et al., 1998).

The ADDES was developed using the diagnostic criteria for A-D/HD described in the DSM-III-R (APA, 1987). For the purposes of clinical and experimental use the changes to the diagnosis of A-D/HD incorporated in DSM-IV (APA, 1994) do not appear to affect the usefulness of this instrument, as the nature and descriptions of the behaviours have not changed, nor is the instrument's diagnostic potential dependant on the diagnostic criteria laid out in DSM-III-R, or for that matter, in DSM-IV. It is a descriptive measure of the behaviours described by numerous authors rated on the basis of their frequency of occurrence in the overall behaviour of the individual being rated (McCarney, 1989).

The CBCL and TRF-CBCL differ from the ADDES in that they are intended to produce standardised descriptions of a variety of children's behaviour rather than specific diagnostic inferences (Achenbach, 1991). Once again the utility of the CBCL and the TRF-CBCL is not impaired by the changes in diagnostic criteria between DSM-III-R (APA, 1987) and DSM-IV (APA, 1994).

The CBCL and the TRF-CBCL "...provide an empirical foundation for identifying syndromes from which to construct a taxonomy of childhood disorders" (Achenbach, 1991a, p. 31). The instruments are intended to identify factors which are relevant to the diagnosis and treatment of psychopathology. In this they are intended to fit within the American Psychiatric Association's conceptualization of psychiatric disorders as multi-axial constructs. The CBCL and the TRF-CBCL provide empirical data on the behavioural aspects of an individual's functioning, which is one of the five axes of the multi-axial model of empirical assessment of children proposed by Achenbach & McConaughy (1987) and by the American Psychiatric Association, (APA, 1994).

The ADDES is " ...designed to provide a measure of those characteristics of Attention-deficit Disorders: Inattention, Impulsivity, and Hyperactivity" (McCarney, 1989a, p. 3). As with the CBCL and the TRF-CBCL, the ADDES assesses the presence and severity of behaviours. It is based on the conceptualization of A-D/HD developed for the DSM-III-R (APA, 1987). The instrument uses questions gathered from the educational environment which through Factor Analysis were shown to load on the three core characteristics of the disorder. The ADDES, therefore, is a measure of behaviours which are diagnostically significant for A-D/HD and which can be quantified in the school or home environment by the use of the appropriate form (McCarney, 1989a; 1989b).

The instrument selected to measure the participants' perceived Locus of

Control was the *Nowicki and Strickland Children's Locus of Control Scale* (CNS-IE) (Nowicki & Strickland, 1973). This is an instrument which has been used widely both in Australia and elsewhere (La Montagne & Hepworth, 1991; Lefcourt 1982; O'Brien & Kabanoff, 1981; Ralph, Merralls, Hart, Porter & Su-Neo, 1995; Spillane, 1980; Tiggemann, Winefield, Winefield & Goldney, 1991).

The CNS-IE was developed from the earlier instruments constructed to evaluate the Locus of Control construct, in particular those of Bialer (1961) and Battle and Rotter (1963).

The CNS-IE is derived from the original theoretical work of Julian Rotter (1960; 1966) which took the position that the effectiveness of reinforcement was dependent upon the perception of the individual of a causal relationship between their behaviour and reinforcement (Nowicki & Strickland, 1973, p. 148).

The ability to assess perceived Locus of Control and to evaluate changes to the individual's perceptions of their own Locus of Control led to the development of several instruments in the period 1957 to 1966, in particular those mentioned above. The CNS-IE is intended to provide a measure of the Locus of Control construct in a school – age population, with the option of individual or group administration. The instrument provides information about the cognitive aspects of the subject, through their awareness of their ability to control their behaviour and its reinforcement, as well as addressing the behavioural issue of the perceived effectiveness of reinforcement.

The CNS-IE has been shown to be a stable and reliable measure of the perceived Locus of Control construct in children. As it is suitable and intended for both individual and group administration (Lefcourt, 1982) it was possible to administer the CNS-IE to quite large groups of children for normative purposes as well as to assess the perceived Locus of Control

of each of the participants in the program.

The chosen intervention program, *Stop, Think, Do*, is a social problem-solving approach to behaviour management. The program is intended to reinforce and develop pro-social attitudes in students. It also builds individual confidence and the power to affect outcomes, thus encouraging control (Petersen & Gannoni, 1992, p. 1).

One of the specific aims of the *Stop, Think, Do* program is “to empower children to take more control, purpose and responsibility for their personal well being, academic and social success” (Petersen & Gannoni, 1992, p. 7).

The social and cognitive emphasis of *Stop, Think, Do*, along with its goal of developing the perception of control over behaviour, makes it highly suitable for use in attempting to change the perceived Locus of Control of children and adolescents from a predominantly external to more internal perceived Locus of Control.

The remainder of this chapter considers the psychometric and operational aspects of the instruments chosen for the research. Aspects of their development, suitability and previous use in an Australian context are considered. The emphasis will be placed on the validity of the questionnaires and the intervention program, while also considering their usefulness in measuring or effecting change in the perceived Locus of Control of children.

## **4.2 Attention – Deficit / Hyperactivity Disorder: *Child Behavior Checklist* and *Teacher Report Form of the Child Behavior Checklist***

Two of the instruments utilised to quantify attentional deficits in this research were the *Child Behavior Checklist* (CBCL) and its classroom equivalent form, the *Teacher Report Form of the Child Behavior Checklist* (TRF-CBCL). Both were originally published in 1983 by Achenbach and Edelbrock after a period of development of several years (Achenbach & McConaughy, 1987).

The CBCL and TRF-CBCL were developed initially as instruments for screening paediatric patients at the University of Vermont Psychiatric Centre as well as to provide pre-intervention and post-intervention measures of behaviours as a tool in the evaluation of therapeutic programs (Achenbach, 1991a; 1991b). The usefulness of the instruments for application in a wider range of settings soon became apparent which led to their formal publication and wider availability.

Both the CBCL and TRF-CBCL include syndrome scales which relate to constellations of behaviour that provide a clear indication of the presence of attentional deficits in the child's observed behaviour at the time of rating (Edelbrock et al, 1985).

The *Attention Problems* scale maintains consistency with the diagnostic criteria of DSM-IV, even though the instrument was published before the development of the DSM-IV was completed (Barkley, 1995). High or clinically significant scores (percentile rank  $\geq 98$ , equivalent to a *T*-score 70) on the *Social Problems* and *Aggressive Behavior* scales also indicate a clinical diagnosis of A-D/HD with a reasonably high degree of reliability (Atkins & Pelham, 1991).



## **Validity of the *Child Behavior Checklist* and the *Teacher Report Form of the Child Behavior Checklist***

*Validity*, in the context of psycho-educational assessment, refers to the accuracy with which an instrument measures the properties or characteristics which it is purported to measure. It has a number of facets, the most important in examining the appropriateness for using the CBCL in research such as this project being *Construct Validity*, *Criterion Validity* and *Content Validity* (Walker, 1985, p. 242). Validity must also be considered and qualified in the context of the instrument's intended purpose and the populations on which it has been standardised, or for which norms have been developed subsequent to publication (Barnett & Zucker, 1992, pp 58 - 59).

The *Construct Validity* of the CBCL and of the TRF-CBCL is based on comparisons with other established measures of the behaviours which they are intended to measure. One measure in particular which has been chosen for comparison by Achenbach is the *Conners Parents Questionnaire* (CPQ) (Conners, 1969) which has been widely used to investigate A-D/HD over the last 30 years (Barkley, 1990; 1995). As A-D/HD is one of the two core concepts on which this thesis is based, it is appropriate to consider the comparisons made between these two instruments.

The correlation between the *Total Problems* scale of the CPQ and the *Total Problems* scale of the CBCL cited in the CBCL manual is .82 (Achenbach, 1991, p. 85).

For individual scales the association is also strong with quoted

correlations of .86 between *Aggressive Behaviours* (CBCL) and *Conduct Problems* (CPQ), .77 between *Delinquent Behaviour* (CBCL) and *Anti-Social* (CPQ) and .59 between *Attention Problems* (CBCL) and *Impulsivity - Hyperactivity* (CPQ).

The full-scale correlations for the TRF-CBCL are very similar, with a correlation of .83 between the *Total Problems* scale of the TRF-CBCL and the *Total Problems* scale on later versions of the CPQ, (Goyette, Conners & Ulrich, 1978).

The correlations between the scales cited for the CBCL are very similar for the TRF-CBCL as well. The correlation between *Aggressive Behavior* (TRF-CBCL) and the *Conduct Problems* (CPQ) is given as .80, whilst that between *Delinquent Behavior* (TRF-CBCL) and *Conduct Problems* (CPQ) is .62 (Achenbach, 1991a, p. 70). The *Revised Conners Questionnaire* also includes an *Inattention* scale, whose correlation with the *Attention Problems* scale of the TRF-CBCL is, at .80, also very high (Achenbach, 1991a, p. 70).

Strong correlations have also been reported for the first versions of the CBCL and the TRF-CBCL with the CPQ by Atkins and Pelham (1991, p. 199). Similar results were obtained in a study by Edelbrock, et al. (1985). The results of this were correlations of between .62 and .90 for the different scales of the two measures. As has been previously discussed, the differences between the 1983 and the 1991 versions of the CBCL and TRF-CBCL, as discussed in the respective manuals, are so slight that the comparisons made with the earlier version can still be taken to apply to the later version as well. The consistent strength of these correlations confirms the *Construct Validity* of the CBCL and TRF-CBCL.

Examination of the *Criterion Validity* for the CBCL and the TRF-CBCL from other studies is quite strong. Edelbrock and Costello (1988) found that there were significant correlations between ratings on the CBCL and

/ or TRF-CBCL, and clinical ratings. This echoes the findings of the study by Boyle and Jones, cited previously, where the CBCL was able to discriminate clearly between clinical and non-clinical levels of behavioural disturbance (Boyle & Jones, 1985).

In a slightly modified form the CBCL and TRF-CBCL were used in the *Western Australian Child Health Survey* in 1993 (Zubrick et al, 1995; 1996; 1997). The results of this very large and extremely detailed study of the physical and mental health of children and families in Western Australia found that the proportion of respondents whose children were receiving medication for A-D/HD was 0.8%. The proportion which returned clinically significant results on the *Attention Problems* scale of either the CBCL or TRF-CBCL component of the survey was 6.3%.

This figure is consistent with the proportion of individuals rated as being in the clinical range of severity of A-D/HD symptomatic behaviours by Edelbrock and Costello (1988) and also in studies quoted by Barkley (1988) in his review of the morbidity rates for A-D/HD. These observations of comparable prevalence estimates further validates the use of the instruments in Western Australian contexts.

The previously cited study by Boyle and Jones (1985) referred to in the section on reliability also found the *Discriminative Validity* of the CBCL and TRF-CBCL to be highly satisfactory, as they were able to distinguish clinical from non clinical individuals with a high degree of accuracy.

These instruments are therefore able to discriminate between behaviour levels which are clinical and those which are below the clinical level of severity in individuals and they can be used to evaluate change in behaviour over time, or due to intervention

The *Content Validity* of the CBCL and TRF-CBCL has been established through initial studies carried out by Achenbach (1991; 1991a), with

non-referred students receiving lower ratings on the problem items and higher ratings on the competency items than did the sample of clinically referred children (Achenbach, 1991; Boyle & Jones, 1985; Cohen, Gotlib, Kershner & Wehrspann, 1985; Edelbrock & Costello, 1988; Hinshaw, Han, Erhardt & Huber, 1992).

### **Validity of the *Child Behavior Checklist* and the *Teacher Report Form of the Child Behaviour Checklist* in a Western Australian Context**

The 1997 report of the Australian NHMRC includes a strong recommendation for the use of the CBCL and TRF-CBCL as assessment tools for diagnosis and management of A-D/HD.

The CBCL and TRF-CBCL have been widely used in Australia with Australian, and notably, through the Western Australian Child Health Survey (Zubrick et al., 1995; 1996; 1997), Western Australian settings. The CBCL and TRF-CBCL are widely used by the School Psychology Service of the Education Department of Western Australia, as well as other government and non-government agencies to evaluate reported behavioural difficulties in children and adolescents who are referred to them for assistance. These instruments are therefore familiar to many teachers, including those in the schools where the research was conducted.

The CBCL and TRF-CBCL have been used in Western Australian studies of A-D/HD (Lewin & Fletcher, 1993), as well as a part of more global examinations such as the Western Australian Child Health Survey (Zubrick et al. 1995; 1996; 1997), as mentioned previously. This very large study used slightly adapted versions of the CBCL and TRF-CBCL

to assess both the frequency and magnitude of children's behavioural difficulties as a part of overall physical health, mental health, and risk factors.

Although the data collected by the survey has yet to be completely evaluated and made public, the published statistics for A-D/HD in Western Australia at the time of the current research indicate that the morbidity rate is approximately 1.6% of the population in the 5 – 18 age group. This finding is consistent with some estimates based on clinical reporting (Green & Chee 1994; Prior & Griffin, 1985), but lower than some others for similar North American populations, such as reported by Henker and Whalen (1981), where figures of up to 8% – 10% have been reported.

The choice of the CBCL and TRF-CBCL as instruments for this thesis was based on the large supporting literature regarding their use as diagnostic tools and in quantifying the severity of the behaviours. As they are not tied to particular diagnostic schemes but provide standardized descriptions of behaviours (Achenbach, 1991, p. iii), they can be used to address issues of comorbid disorders and complicating factors such as clinically significant scores on a wide range of CBCL and TRF-CBCL *Problem Scales* (Barkley, 1990, pp. 296 - 297) which may indicate more pervasive problems. In the context of this research these qualities would have been used to eliminate individuals who did not fully meet the criteria for diagnosis with A-D/HD, or who met the diagnostic criteria for other disorders or syndromes as well as A-D/HD, whose presence would have exerted a confounding effect on the results of the intervention.

## **Reliability of the *Child Behavior Checklist* and the *Teacher Report Form of the Child Behaviour Checklist***

The CBCL and TRF-CBCL manuals report excellent properties of reliability, that are confirmed by direct reports on their characteristics and qualities such as those in *Tests in Print IV* (Murphy, Conoley, & Impara, 1994) and *The Twelfth Mental Measurements Yearbook* (Conoley & Impara, 1995).

*Reliability* in the context of the properties of an educational or psychological assessment refers to the level of agreement between repeated administrations of the instrument (Walker, 1985, p. 238), or the “degree to which measures are stable, repeatable and consistent for an individual” (Barnett & Zucker, 1992, p. 70). In the case of a rating scale the reliability can refer to the stability of results when there is repetition of rating either by the same rater, or by multiple, independent, raters, depending upon the circumstances.

Although it is apparent that repeated ratings by the same individual is the desired mode, it must be recognised that in applied settings this is not always possible, for example when ratings are completed in different school years where there is normally a change of teacher.

It was particularly important to select instruments with high inter-rater reliability in this study because at Chidley Educational Centre, where much of the research occurred, students were moved between different class groups depending upon their needs at particular times.

Inter-rater reliability cited for the CBCL in its manual is very high for the *Competence Scale* questions (.93) and for the *Problem Scales* (.96) (Achenbach, 1991, p. 71).

The test-retest reliability for the TRF-CBCL is high with correlations of .90 for the *Adaptive Scales* and .92 for the *Problem Scales* for a retest with a 15 day interval (Achenbach, 1991a, pp. 58 - 59). The *Test – Retest Reliability* for the CBCL is also reported to be very strong for the *Competence Scales* (.87) and for the *Problem Scales* (.89) after an interval of 7 days (Achenbach, 1991, pp. 70 - 72).

A further study by Edelbrock, Greenbaum and Conover (1985), found that the test - retest reliability of the TRF-CBCL over a 7 day period was very strong with correlations of .91 for the *Adaptive Scales* and .87 for the *Problem Scales*.

The validity and reliability of the CBCL and TRF-CBCL were considered to be sufficiently strong for the purposes of this research. The two instruments were therefore used to measure the severity of behaviours symptomatic of Attentional Deficit.

### **4.3            Attention – Deficit / Hyperactivity Disorder: The *Attention Deficit Disorders Evaluation Scale***

The ADDES is designed to provide measures of the three major axes of A-D/HD, consistent with the DSM-III-R (APA, 1987). The accepted criteria when the instrument was developed and published were: *Inattentiveness, Impulsivity, and Hyperactivity* (McCarney, 1989, p. 3). A revised version has subsequently been published during the course of this study which incorporated minor changes to the wording of the instrument, making it consistent with DSM-IV (APA, 1994; Holland, Gimpel & Merrell, 1999).

The ADDES differs in principle from the CBCL and TRF-CBCL in that it is intended to provide a quantification of behaviours associated with A-D/HD, rather than reporting on a variety of behaviours.

The ADDES was chosen for use in this research because it was believed that the use of an additional instrument would provide confirmatory evidence of the presence or otherwise of A-D/HD in the participants. It was also employed to discover whether certain aspects of A-D/HD (*Inattention, Impulsivity, and Hyperactivity*) were more predictive of external perceived Locus of Control than were others.

In a similar manner to the CBCL, the ADDES is provided with separate but comparable forms for teacher and parent completion. The number of items and the wording of specific items varies between the two instruments to reflect differences between the home and school settings.

## **Validity of the *Attention Deficit Disorders Evaluation Scale***

The *Criterion Validity* of the ADDES has been established by comparison with the *ADD-H Comprehensive Teacher's Rating Scale* (ACTeRS) (Ullman, Sleator & Sprague, 1988). The ACTeRS was developed to give a detailed assessment of children with attention problems and also to discriminate between those with A-D/HD and those with less severe attentional, hyperactivity, and/or impulsivity problems (Braswell & Bloomquist, 1991; Ullman et al., 1988).

Although not as widely used as the Conners scales the ACTeRS has been described as an effective and valid measure of A-D/HD, with the *Construct Validity* of the instrument based on factor analysis of the items



(Barkley, 1990, p. 667; Conoley & Impara, 1995; Holland, Gimpel & Merrell, 1999; M<sup>c</sup>Kinney et al., 1993, p. 126).

## **Reliability of the *Attention Deficit Disorders Evaluation Scale***

The reliability of the ADDES is discussed in the two manuals in terms of the test-retest reliability, *Inter-Relater Reliability* and the *Internal Consistency Reliability* (M<sup>c</sup>Carney, 1989a, pp. 12 - 13).

The *Test-Retest Reliability* for the School Version of the ADDES is stated as being .92 with a 30 day inter-test interval, with reliabilities of between .89 and .97 for the Subscales (*Inattention, Impulsiveness, Hyperactivity*) (M<sup>c</sup>Carney, 1989a, p. 12). A similar test-retest reliability value is given for the Home Version of the ADDES (M<sup>c</sup>Carney, 1989b )

The *Inter-Rater Reliability* assessment among teachers was determined for the School Version of the ADDES to be .85, generally considered to be more than adequate. The correlations for the Home Version of the ADDES are of a similar magnitude; the mean being quoted in the manuals as .82 and the range from .80 to .84 across all age groups (M<sup>c</sup>Carney, 1989a, p. 12; M<sup>c</sup>Carney, 1989b, p. 12).

On the basis of these outcomes it was decided to include the ADDES in the research both because it provided a valid and reliable measure of Attentional Deficit and because it provided separate scores for three aspects of A-D/HD, allowing for the examination of each of these separately.

#### **4.4 Locus of Control: The *Nowicki and Strickland Children's Locus of Control Scale***

The *Nowicki and Strickland Locus of Control Scale for Children (CNS-IE)* was originally developed and published in 1973 to provide a measure of internal and external perceived locus of control across a number of motivational and/or interpersonal areas: Dependency, affiliation, achievement, and decision – making (LaMontagne & Hepworth, 1991; Nowicki & Strickland, 1973).

The CNS-IE was developed to meet a perceived need for a reliable and valid measure of Locus of Control in Children (Nowicki & Strickland, 1973). It has remained in use since that time as an instrument for measuring the perceived Locus of Control of children.

#### **Validity of the *Nowicki and Strickland Children's Locus of Control Scale***

The *Construct Validity* of the CNS-IE has been assessed in terms of its strength of association with the *Rotter I-E scale* (Rotter, 1960), the *Bialer – Cromwell Scale* (Bialer, 1961) and the *Intellectual Achievement Responsibility Scale*. All of these instruments were designed to measure the construct of perceived Locus of Control, first identified in theoretical works by Rotter (1954; 1960) and by Bandura and Walters (1963).

The correlation reported by Nowicki and Strickland between the CNS-IE and the *Intellectual Achievement Responsibility Scale* is .51 for seventh grade (U.S.) children, while the correlation with the *Bialer - Cromwell Scale* is .41 for a sample of students aged between 9 and 11 years. Both

correlation coefficients are significantly greater than zero, indicating a strong positive relationship between these measures and the CNS-IE (Nowicki & Strickland, 1973).

For the comparison with the Rotter I-E Scale, which is intended for college students, the instrument was modified slightly, the word “kids” in the original CNS-IE items being replaced with “people”. The significant correlations cited are .61 and .38 (Nowicki & Strickland, 1973).

### **Validity of the *Nowicki and Strickland Children’s Locus of Control Scale* in an Australian Context**

There have been a small number of cross-cultural studies intended to establish the appropriateness and norms for American measures of Locus of Control in an Australian setting. Spillane found no significant differences between Australian and American adults (Spillane, 1980).

The CNS-IE has also been used in Australia to research children’s Locus of Control. In Kilpatrick and Williams (1998) for example, the CNS-IE was used effectively to evaluate the externality of Locus of Control as a potential mediator in *Post-Traumatic Stress Disorder* in children who had witnessed incidents of domestic violence (Kilpatrick & Williams, 1998, p. 319). The results of this study indicated that the CNS-IE is still an effective instrument for measuring perceived Locus of Control in Australian children aged 6 to 12 years.

A study by Gomez (1997) using the CNS-IE found that the instrument was a consistent measure of perceived Locus of Control and that internalising scores were a strong predictor of effective coping behaviours. DeMello and Imms (1999) found that the CNS-IE was an

effective measure of perceived Locus of Control in adolescent boys and girls, finding significant correlations between low scores on the instrument (indicating relative internality of perceived Locus of Control) and self esteem and academic coping.

### **Reliability of the *Nowicki and Strickland Children's Locus of Control Scale***

The *Test – Retest Reliability* coefficient quoted for the CNS-IE varies between .63 and .71 (Nowicki & Strickland, 1973) depending upon the age of the subjects, a finding echoed by later research, and, although the specific figure for reliability of this instrument has varied somewhat between each of the studies, usually due to variation in the interval between administrations (LaMontagne & Hepworth, 1991; Nowicki & Duke, 1974).

Not enough detail is provided in the studies to quantify the variations due to this variable. Most studies have apparently followed Nowicki and Strickland's statistics based on a 6 week test - retest interval (Nowicki & Strickland, 1973, p. 152). In a review of assessment methods, Kline cites a similar figure: "test - retest reliability varies, partly depending on the time interval, but is satisfactory being around .7" (Kline, 1993, p. 539).

The *Internal Consistency Reliability* of the CNS-IE given in Nowicki and Strickland (1973) varies between .63 for third grade children to .81 for twelfth grade children, based on the split – half method, corrected with the Spearman – Brown formula. Nowicki and Strickland state that in this instance: "Since the test is additive and the items are not comparable the split – half reliabilities tend to underestimate the true internal consistency of the scale" (p. 152). In Kline's review of the instrument he

cites a figure of .75 for the split – half reliability of the CNS-IE (Kline, 1993, p. 539). Gomez, in a recent Australian study, cites a figure of .73 for the *Internal Consistency Reliability* of the CNS-IE (Gomez, 1997, p. 393).

On the basis of the considerable evidence from the literature it may be concluded that the CNS-IE is a valid and reliable measure of the Locus of Control construct in children. Its extensive use over a long period of time and in a variety of settings underline the appropriateness for the present research.

#### **4.5 Cognitive – Behavioural Intervention: *Stop, Think, Do***

*Stop, Think, Do* was developed to provide a systematic training program for developing social skills in primary and younger secondary students. It is intended for use by school psychologists or by teachers who have undergone the teacher training program provided by the manuals.

*Stop, Think Do* uses a Behavioural and Cognitive Problem Solving approach to self-management of behaviour and the development of problem solving skills (Petersen & Gannoni, 1992), and includes both experiential and didactic aspects (Petersen, 1995). This was seen as an advantage for the present research as it is consistent with the need for direct experience and repeated practice which has been identified as being highly important for success in programs for children diagnosed with A-D/HD (Barkley, 1990; 1995; Douglas, Parry, Marton & Garson, 1976).

The program has been widely used in Australian schools and has been demonstrated to be effective in developing self-management skills and

pro-social behaviours (Conway, 1998). It has been used successfully with school populations have been identified as having clinically significant level of social/emotional problems and poor social skills (Beck & Horne, 1992), and has also been found to be effective in clinical settings (Andary, 1990).

A research report on *Stop, Think, Do* found that it was effective in developing social skills in a group of children aged between 7 and 11 years who had been identified as having very poor social skills (Nimmo, 1993). The students who were part of the *Stop, Think, Do* intervention groups demonstrated significant increases in social skills and peer acceptance than did the control group. It was also reported that the children who had participated in the program demonstrated improvements in social functioning over a three month period (Nimmo, 1993).

Petersen (1994) summarized the literature on *Stop, Think, Do* to that time, highlighting its effectiveness with special populations such as students with intellectual disabilities and those with clinically significant behavioural disorders, although, it must be noted, A-D/HD populations were not specifically identified amongst these.

*Stop, Think, Do* has been specified by the Education Department of Western Australia as an appropriate intervention strategy in its *Behaviour Management in Schools* policy (Education Department of Western Australia, 1998) and as a resource for schools in developing pro-social behaviours in students, including those diagnosed with A-D/HD.

In the school context the effectiveness of a program also raises issues relating to the diversion of time from academic tasks to behavioural concerns. The benefits derived from participating in a cognitive - behavioural intervention such as *Stop, Think, Do* must clearly be sufficient to balance the loss of academic engaged time, which is in itself

a major determinant of academic success (Whitaker, 1995).

The focus of *Stop, Think, Do* is to develop social skills that assist in interactions with peers and adults (Petersen & Gannoni, 1994, p. 3). Russell Barkley reported that social skills deficits are common among children with A-D/HD and that addressing social skills in a cognitive - behavioural manner can be an effective strategy for developing control and perceived control of social behaviours (Barkley, 1990).

Although the cognitive - behavioural program developed and described by Barkley (1990) differs in its details from *Stop, Think, Do*, the skills which both programs seek to develop are very similar.

Both programs address needs for social entry skills, in making and retaining friends, starting conversations, and successfully interacting with others in social, home, and school settings.

Both Barkley's program and *Stop, Think, Do* include components which assist the participants in dealing with anger, or in preventing situations where they could become angry from occurring, and with problem-solving and conflict resolution.

The component of cognitive - behavioural programs used successfully with A-D/HD children that appears to be most effective is the *Attributional Retraining* of children to help them in reappraising their explanations for the causes of events and behaviours, the goal of which is the development of a more functional set of beliefs about their control over the outcomes of behaviours or events (Braswell & Bloomquist, 1991, pp. 90 - 91).

This aspect of cognitive - behavioural intervention, the ability to change the individual's perceived Locus of Control, is pivotal to this thesis. *Stop, Think, Do* was chosen as the intervention for this research because

unlike other interventions cited in the literature (Barkley, 1990; Braswell & Bloomquist, 1991) it addresses the issue of changing Locus of Control, as well as providing an effective and developmentally appropriate framework for addressing the behavioural needs of the participants, in particular the linking of behaviour and reinforcers.

The *Stop, Think, Do* program consists of six components which are combined across sessions, although not all components are present in every session:

1. *Communication:*

Paying attention to other people, determine their feelings, reflect these feelings, rather than reacting impulsively, identifying own feelings and expressing them clearly and honestly.

2. *Problem Solving:*

**Stop:**

Clarify the problem, what they are feeling and what they want to happen next.

**Think:**

Generate possible solutions to the problem. Also think of the possible consequences of the solution and how other people feel about them.

**Do:**

Choose the solution with the best outcomes (the one with



the most acceptable consequences).

If this does not work, the cycle recommences.

**3. *Strategy Evaluation:***

Following problem solving, focus on the various possible solutions. Consideration is given to assertive solutions as opposed to passive or aggressive ones. Consideration, respect, and cooperation are emphasised.

**4. *Motivational Component:***

By analyzing the consequences of their actions and receiving feedback continuously, the students are encouraged to refine or modify their goals and the behaviours that will achieve them.

**5. *Assessment - Evaluation Component:***

The assessment and evaluation is conducted by the program instructor using the materials in Appendix two of the *Stop, Think, Do* manual. Students may also complete a self-assessment on each of the program goals. Post intervention materials are also included to evaluate the overall program.

**6. *Behaviour Management Component:***

The component uses behaviour management methods which are consistent with the aims of developing social skills. It is done in the context of social problem - solving, using limit setting and the encouragement of compliance

rather than coercion. Incidents of inappropriate behaviour can be used as exercises for the group in demonstrating the skills they are developing

(Petersen & Gannoni, 1992, pp. 4 - 7).

The components are consistent with those of other cognitive - behavioural interventions, where communication, problem identification and problem solving, evaluating strategies, and envisaging the consequences of particular courses of action or behaviour are the bases of the intervention (Barkley, 1990, pp. 542 - 544; Braswell & Bloomquist, 1991, pp. 213 - 220).

*Stop, Think, Do*, therefore, possesses the attributes and content which have been found to be effective in cognitive - behavioural interventions for children with a range of behavioural problems.

*Stop, Think, Do* addresses each of the four executive functions described by Barkley (1995; 1998). The Problem Solving component in particular develops skills and understanding in each of the four executive functions. The practice and incremental development of competencies aspects of *Stop, Think, Do* also provide support and consistent reinforcement for participants, important considerations for children with A-D/HD, as we have seen (Barkley, 1995; 1998; Braswell & Bloomquist, 1991; Edwards & Barkley, 1997; Petersen & Gannoni, 1992).

Table 4.1 is a matrix which has been constructed to demonstrate how the components of the *Stop, Think, Do* program and those of the *Behavioural Disinhibition model* of A-D/HD relate to one another. The components of the program are taken directly from the *Stop, Think, Do* manual (Petersen & Gannoni, 1992) and have been assigned to cells in the matrix on the basis of the researcher's interpretation and analysis of their properties.

**Psychometric Aspects of the Research Program**

Behavioural Disinhibition Model of A-D/HD

		Nonverbal Working Memory	Self-regulation of Affect	Internalization of Self-directed Speech	Reconstitution
S T O P  T H I N K  D O	Communication		Identify own feelings and express them honestly		Analyse consequences and synthesise solutions, rather than acting impulsively
	Problem Solving	Identify goals and manipulate events mentally	Clarify problems and how they and others are feeling about it	Describe and select actions internally based on predicted outcomes and consequences	Selecting the most appropriate strategy
	Strategy Evaluation	Anticipate consequences from previous experience	Distinguish between <i>Weak, Cool, or Aggro</i> solutions		Assess the effectiveness of strategies and make appropriate choices
	Motivational Component	Analyse the consequences of behaviour based on experience	Regulation and use of arousal to achieve goals	Reflect on the goals they wish to achieve	
	Behaviour Management	Identify and anticipates situations that may lead to problems before they arise		Reflect of the consequences of breaking agreed rules / responsibilities	
	Evaluation and Assessment			Develop Internal pictures of self to assist planning future strategies	Assess the effectiveness of strategies used

Table 4.1 Matrix demonstrating the relationship between components of the *Stop, Think, Do intervention* and elements of the *Behavioural Disinhibition model of A-D/HD*.

## **4.6 Conclusions**

In conclusion, the instruments selected for this research have been chosen on the basis of their extensive use with similar populations and their demonstrated strengths in validity and reliability. The questionnaires have been used successfully to discriminate A-D/HD from non-A-D/HD populations. The *Stop, Think, Do* intervention program has been used successfully to address behaviour, responsibility and social issues in a variety of children and adolescents with behavioural disorders.

The chosen instruments therefore are probably the best of those available for addressing the issues raised by this thesis.

# Chapter 5

## **Methods & Procedures**

The research project is intended to investigate the relationship between perceived Locus of Control and deficits in attention in boys who have been diagnosed as having A-D/HD and who are receiving treatment for this disorder. The study is conceptualised as a clinical study rather than an experimental design *per se*. Although this approach is less useful in research terms than a purely experimental design would be in generating substantive conclusions, it was largely dictated by the difficulties faced by the Researcher in obtaining appropriate participants to form a true control group, both in the time available within the school settings employed and the need to run simultaneous groups of students through the *Stop, Think, Do* intervention.

Comparisons will be made between the level of externality of perceived Locus of Control of two groups of boys referred to the Researcher for educational / behavioural interventions on the basis of their behavioural difficulties. The first, larger, group comprised boys diagnosed with A-D/HD and the second, smaller, group comprised boys with behavioural issues that clearly did not meet the diagnostic criteria for A-D/HD.

Comparisons of externality of perceived Locus of Control are then made

before and after the *Stop, Think, Do* cognitive - behavioural intervention designed to enhance self-regulation and develop a more internal perceived Locus of Control in the participants.

## **5.1 Participants**

Three hundred and sixty eight boys were used to establish local norms for the CNS-IE Locus of Control instrument. These boys were the classmates of the A-D/HD participants and included the 23 boys who undertook the *Stop, Think, Do* program as the clinical comparison group. Table 5.1 contains the mean scores for boys in the grades 4 through 9 (The CNS-IE norms are provided for school year rather than chronological age) for the local norming group and the original published norms (Nowicki & Strickland, 1973). Figure 5.1 presents the same information in graphical form for easier comparison.

The comparisons were made using Student's *t* (Lumsden, 1974, pp 100 - 106). The comparisons were made at each grade level and in no instance did the *t* reach the critical value. These comparisons between the two sets of norms show that there are no significant differences between the original normative population and the population from which the participants in this research were drawn.

Seventy seven A-D/HD participants and twenty three clinical comparison group participants were involved in the intervention phase of the research. The clinical comparison group participants were drawn from the normative group, who comprised the classmates of the A-D/HD participants. The twenty three boys in the clinical comparison group presented with behaviour problems and had been referred to the School Psychology Service of EDWA for cognitive-behavioural intervention, but who did not meet the diagnostic criteria for A-D/HD. The availability of

Published Norms							
Grade	4	5	6	7	8	9	
N	59	40	45	65	75	43	
Mean	18.44	18.32	13.73	13.15	14.73	13.81	
Standard Deviation	3.58	4.38	5.16	4.87	4.35	4.06	
Normative Group							
Grade	4	5	6	7	8	9	
N	40	86	75	52	60	55	
Mean	18.71	17.43	13.54	13.89	15.43	14.49	
Standard Deviation	4.91	4.64	2.19	3.71	4.30	3.46	
<i>t</i>	-0.11	1.03	0.63	1.76	-1.89	-1.82	
(df)	(97)	(126)	(118)	(115)	(133)	(102)	

**Table 5.1 Means and standard deviations of CNS-IE scores for the normative group and the original published norms, ages 8 – 14.**

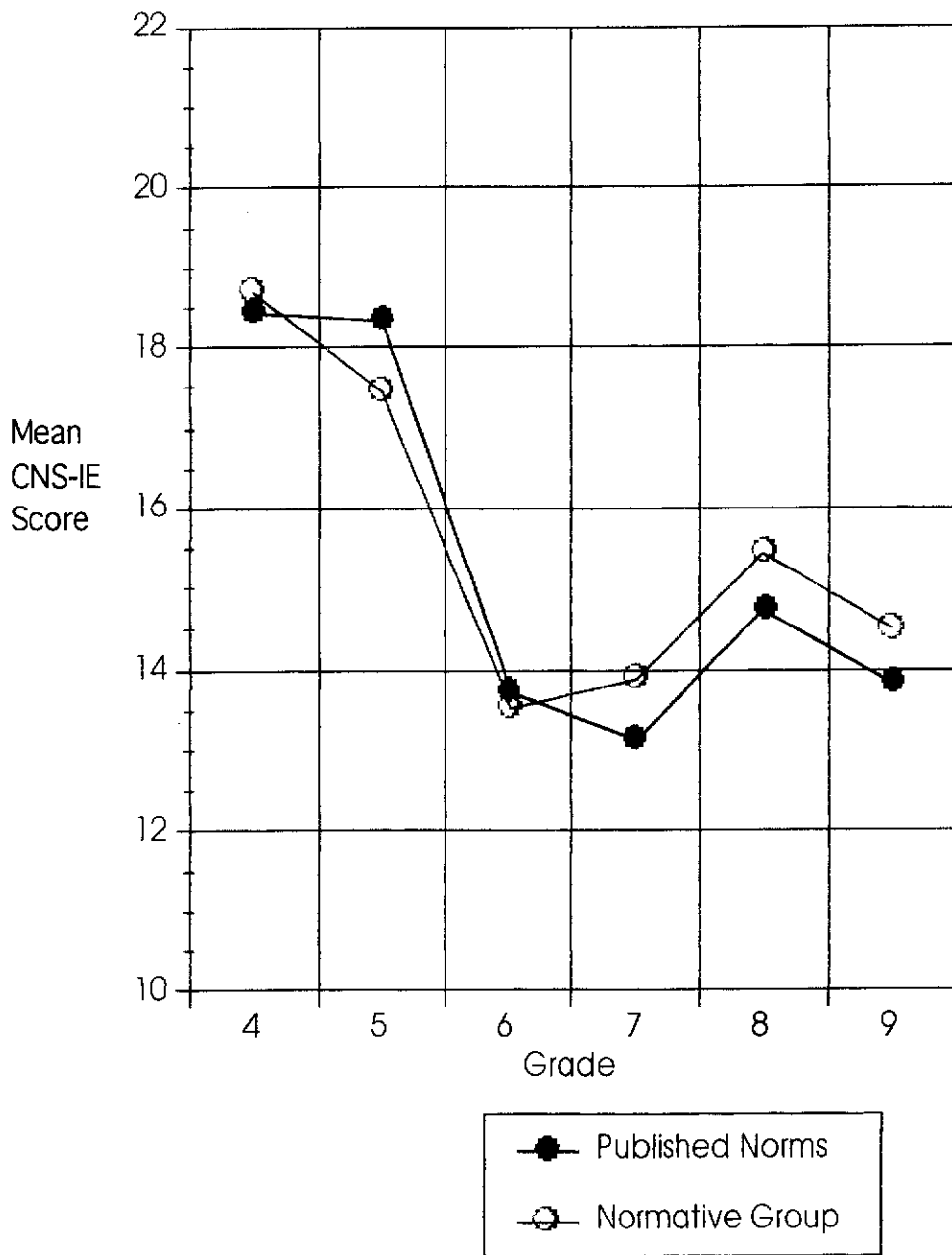


Figure 5.1 Comparison of means of CNS-IE scores for the normative group and the original published norms, years 4- 9.



this group enabled comparisons between the A-D/HD participants and boys with other behavioural issues who also participated in the *Stop, Think, Do* program..

The comparison group did not comprise a subthreshold group of children with A-D/HD. They had been referred to the Researcher for assistance with behavioural problems relating to classroom behaviour, social difficulties, and/or aggressive behaviours and were clinically different to the boys with A-D/HD.

With the present clinical and ethical guidelines directing the work of school psychologists, including the Researcher, this was the best available strategy, as, at the time the research was conducted, a direct referral relating to the school and individual's needs was required before students could be participants in a cognitive - behavioural intervention such as *Stop, Think, Do*. In the future, however, a more comprehensive research design (e.g., 2 x 2: A-D/HD Status x Intervention) should be used as it would better control for the variables of A-D/HD status and participation in the program and thus would enable stronger and more conclusive results to be drawn from the research.

Each participant was male, a student in state schools in either urban or rural areas of Western Australia, and aged between nine and thirteen at the time of their participation in the project.

The broad range of ages resulted from the need to obtain a large enough sample size from which to draw conclusions. The original proposal was to use boys aged eleven or twelve only. However, the Researcher was not able to find sufficient boys who were in that age group, met the other criteria described below, and who were attending the same school – or one sufficiently close as to be able to travel to the *Stop, Think, Do* sessions, to be able to run the intervention appropriately. As a result of this the Researcher after consultation with his supervisor and colleagues

decided to open the age range up to all of those for whom *Stop, Think, Do* was intended. In order to accomplish this the students were more mixed in their ages than was originally intended but this did not appear to affect the running of the sessions nor the implementation of the intervention.

A large proportion (57%) of the A-D/HD Participants were students attending Chidley Educational Centre. These students were referred due to attentional difficulties affecting their learning and which were of sufficient seriousness to require residential treatment at the centre. The rôle of Chidley Educational Centre was to provide assistance and support to primary school aged students with behavioural or learning difficulties except for those resulting from intellectual or sensory disabilities, for whom other services are provided by EDWA.

The placement criteria for Chidley Educational Centre specified the presence of behavioural issues such as A-D/HD or of learning difficulties, which impaired the student's performance such that they were working at a literacy, or literacy and numeracy, level at least two years below their placed grade. Entry was also restricted to students who were attending EDWA Primary Schools, (years 1 to 7) or in the primary school years of District High Schools, which cater for students in years 1 to 10, in the non-metropolitan districts of the Education Department (i.e. those outside of the city of Perth) in Western Australia.

All of those approached as potential participants and who were attending the centre fell into the group for which Chidley Educational Centre provided services at that time on the basis of A-D/HD. Those with other, comorbid, learning difficulties or clinical behaviours were not approached to be participants. The absence of these behavioural and learning factors was established, as far as it is possible to be certain, by the battery of assessments that were conducted to establish eligibility for placement at Chidley and by occupational therapy and speech pathology assessments

that were also required as part of the referral process.

At the time of the project many of the students who were attending Chidley Educational Centre were placed there solely on the basis of the impact of A-D/HD on their academic progress. Some of the students had already been diagnosed with A-D/HD, whilst others were diagnosed with A-D/HD during the time they spent in placement at the centre.

The other participants in the A-D/HD group were attending their usual schools in rural and outer metropolitan schools. These students and their families were approached on the basis of apparently meeting the diagnostic criteria for A-D/HD and, again, not presenting with comorbid clinical or learning difficulties, including appropriate visual, auditory, and motor assessments.

In this way the rôle of comorbid disorders and their effects on perceived Locus of Control and its change were, as far as possible, minimised. The Researcher admits, however, that it is likely that some participants may have had comorbid learning or other disorders which went undetected.

Individual parental permission for participation was obtained for all of the individuals involved in the research. As part of this process an information package was developed that explained:

- The aims of the project,
- The information that was being sought,
- How such information would be used and,
- The means by which confidentiality would be ensured.

This was done to ensure that informed consent was obtained from the

parents of all participants, particularly for those drawn from students at Chidley Educational Centre, with whose parents it was not possible to meet directly. The letter, instructions and information that were provided to the parents are contained in Appendices A and B. Copies of the instruments completed by the parents and teachers of the participants can be found in Appendix C.

All of the children, teachers and parents were fluent English speakers. Potential participants from non-English speaking backgrounds whose mastery of written and spoken English, as assessed by the *Neale Analysis of Reading Ability (Revised)* (Neale, 1988) was below the equivalent of seven years of age were not included in the research. It was considered unlikely that boys with limited communication skills in English would be able to complete the intervention program, which required a relatively high level of competence in the English language both in the written and spoken forms. The age equivalent of seven years was chosen as a criterion following discussions with colleagues experienced in working with students and families from Non-English-Speaking Background (NESB) and the English as a Second language (ESL) areas, and in consultation with officers of the of the Western Australian Ministry of Education, *Policy and Guidelines for the Education of Non-English-Speaking Background Students* (Ministry of Education, 1993).

All A-D/HD participants had been diagnosed as having A-D/HD either:

- As a part of the researcher's contact with them for this project,
- As a result of a prior referral to the researcher due to concerns which led to the diagnosis of A-D/HD, or
- As a result of a referral to a medical specialist or to a School Psychologist for assistance in managing their behaviour.

The participants in the A-D/HD group had been diagnosed as having A-D/HD by a psychologist and a specialist medical practitioner. In 68% of cases the specialist concerned was a paediatrician, 4% were under the treatment of a paediatric neurologist, and 18% of the A-D/HD participants were being treated by paediatric psychiatrists.

As all of these specialist practitioners are permitted to prescribe psychostimulant medication in Western Australia and there were no apparent differences between the assessments and treatments of the participants due to the particular specialist involved, no further distinction will be made between the specialists in this thesis.

The specific basis on which boys were selected for participation in the A-D/HD group was:

- Diagnosis of A-D/HD by a paediatrician, resulting in the prescription and use of psychostimulant medication,
- T-Scores of 70 or above on the *Attention Problems Scale* of the CBCL and / or on the *Attention Problems Scale* of the TRF-CBCL. This represents a frequency of symptomatic behaviours in the uppermost 2% of the population, and
- A total percentile rank score on the *Attention Deficit Disorders Evaluation Scale* in the 0 – 5 range, representing a seriously impairing severity of A-D/HD symptomatic behaviours.

These ratings provided by parents and teachers, along with the clinical assessment by the medical specialist were deemed to be sufficiently reliable an indication of the presence of A-D/HD for inclusion as participants in the A-D/HD group. In each instance psychostimulant medication (either *Dexamphetamine* or *Ritalin*) was being taken as a part of the treatment régime.

During the period of their involvement with the project the A-D/HD group participants remained on psychostimulant medication without change to the dosage. By doing so this eliminated the presence, absence, or changes to the dosage of the psychostimulant medication as a confounding variable as far as possible. No other medication for A-D/HD was being taken by the A-D/HD participants at the time of their participation.

Although this was done to eliminate a potential confounding variable, the Researcher realises and emphasises that by doing so the generalizability of the outcomes of the research may be weakened as a result, and applied fully only to individuals receiving stimulant medication treatment. However, as the use of stimulant medication is widely accepted as being a common and often necessary aspect of the effective treatment of A-D/HD (Cabinet technical Working Party, 1996; EDWA, 1998; Garton, Anderson, Farrelly, Pawsey, Standish & Sansom, 1997; NHMRC, 1997), it may be considered that the presence of stimulant medication may often, or even usually, be present during cognitive-behavioural interventions. Indeed some authors, notably Whalen & Henker (1991), Northup et al. (1999), Jarman (1992), and Barkley (1995), advocate the provision of stimulant medication before the cognitive - behavioural intervention is put in place. Given the evidence for this which is related by these authors, it seems likely that the increased attention and decreased impulsivity and hyperactivity resulting from the medication could make the cognitive - behavioural intervention more likely to be successful.

The other aspect of this issue which requires further research is the continuing effectiveness of the intervention if the participants subsequently cease using stimulant medication.

All of the participants were male to control gender as a possible confounding variable in the research. The use of the classmates of the A-D/HD participants as comparison groups minimised the impact of

demographic and socio-economic variables in making a true comparison between the A-D/HD and the clinical comparison group participants (Walker, 1985).

Non-A-D/HD participants were used in two ways. The largest group formed a check – norm group for the *Nowicki-Strickland Children's Locus of Control Scale* (CNS-IE) (Nowicki & Strickland, 1973). This group, as previously stated, consisted of 368 boys aged between 8 and 14 years of age and was formed from as many as possible of the male classmates from the same school year as the A-D/HD participants who took part in the project.

Twenty three participants were then drawn from the 368 to provide a comparison group for the effects of the *Stop, Think, Do* intervention.

These 23 clinical comparison group participants did not meet the diagnostic criteria for A-D/HD – or for any other specific behavioural disorder – as their scores on the ADDES and the CBCL were below the clinical cutoffs, but who were considered by their teachers to be in need of assistance in developing behavioural self-regulation and interpersonal skills to a similar extent to their peers in the A-D/HD groups. These participants were referred by their parents or classroom teachers, to the researcher on the basis of their moderate level of behavioural and/or social problems.

Students with a moderate level of behavioural / social problems were sought so as to provide the closest match to the A-D/HD participants *except* for the diagnosed presence of A-D/HD. These clinical comparison group participants completed the CNS-IE questionnaire in the same manner as the A-D/HD participants and their parents and teachers completed the CBCL, TRF-CBCL and ADDES instruments in precisely the same manner as did those of the A-D/HD participants.

## **5.2 Settings**

The intervention was conducted in similar seminar rooms or a classroom in each of 8 schools. The size of the rooms was dictated by:

- The number of students in the group,
- Space required for some of the activities in the *Stop, Think, Do* program, which involve rôle-playing or dividing into separated sub-groups, and
- Wall space to display the posters and other stimulus materials for the *Stop, Think, Do* program.

## **5.3 Procedure**

The A-D/HD group participants were recruited through referral by their schools for psychological assessment to establish the presence or otherwise of A-D/HD, or were cases pre-existing in the school.

The clinical comparison group participants were recruited and selected by the same process, except that the presence of A-D/HD or other disorders was specifically excluded in these instances.

The parents of each participant were initially contacted by telephone. This contact was followed up with a written explanation of the research and its aims, along with a permission to participate form. Upon receipt of the permission form the parents and teachers were provided with the CBCL or the TRF-CBCL and ADDES teacher or parent forms as appropriate. These instruments provided an indication of the presence of



A-D/HD in each participant and also the level of severity of attention deficit as measured by each instrument.

The individual instruments were administered in the Researcher's office or in an interview room where possible., The exception to this was the CNS-IE, which was administered to the A-D/HD participants individually and to the clinical comparison group and the normative group in their class groups.

Upon their completion of the consent forms and the A-D/HD rating instruments being returned by parents and teachers, each individual was administered the CNS-IE questionnaire and was assigned to a group of 4 to 6 boys for the *Stop, Think, Do* intervention program. The groups comprised boys from both the A-D/HD and clinical comparison groups and participated in the same activities in each case. This increases the likelihood that the effect would be the same for both the A-D/HD group and the clinical comparison group and would tend to minimise the effect of the Researcher not being blind to the group membership of the participants.

The CNS-IE was administered one week before and one week after the intervention program, so that the interval between administrations was four weeks. The form of the CNS-IE used in the research can be found in Appendix C. The duration of the program is short enough that the effect of maturation on the change in perceived Locus of Control should be minimal. Braswell and Bloomquist (1991) mention cognitive - behavioural interventions that have durations of "several weeks" (p. 92). In comparison this

Although it would clearly have been desirable to conduct a longer term follow up of the participants so as to measure the maintenance of the change in their perceived Locus of Control and the effects on their behaviour, there were difficulties in doing so which precluded a

systematic follow up. The most significant of these were the distances involved - some students lived as far as 2200 Kilometres (by air) from Perth. A further obstacle to effective follow up was that, in most cases, the students were no longer being taught by the same teacher, so comparisons between their behaviour before the intervention and some months afterwards may well have been problematic. It is to be hoped that a further study, adequately resourced to overcome the limitations of the present research, could be conducted at some future date to overcome the limitations of the present research.

#### **5.4 Summary of Administration and Scoring**

The individual instruments used to quantify attention deficits and perceived Locus of Control were administered according to the procedures established by the authors of the instruments. It is pertinent to consider in detail the structure and scoring of these instruments.

#### **Use and Administration of the *Child Behavior Checklist* and *Teacher Report Form of the Child Behaviour Checklist***

The CBCL and TRF-CBCL have since been widely used both in the initial diagnosis of behavioural disorders and also in order to provide measurements of change due to interventions in clinical and A-D/HD settings.

The versions of the CBCL and TRF-CBCL which were used for this project were published in 1991 and are a revision of the original 1984

versions. The changes between the two versions are quite limited and are described fully in the manuals. The changes include changing the basal levels of *T*-Scores for the *Problem Scales* to 50 (a score which represents the 50<sup>th</sup> percentile), changes to the way in which extremely high scores were obtained, the omission of questions relating to physical illnesses from the *Total Problem Score*, and the layout of the scoring profile forms. Achenbach stated that the original version questionnaires may be used with the 1991 version profile form and vice-versa. This indicates little or no difference in the psychometric and normative qualities between the two versions (Achenbach, 1991, pp. 151 - 153).

The CBCL is intended to be completed by the parent or parents of children aged between 4 and 18 years of age. The level of reading ability required for comprehension of the CBCL is stated in the manual to be equivalent to “at least the fifth grade” (Achenbach, 1991, p. 14) This reflects United Stages usage, in Western Australia this equates to a year six level of reading ability. In instances where the parent does not have the literacy skills to cope with the instrument it is recommended that the interviewer should read the questions to them (Achenbach, 1991, pp. 14 - 15).

The manual additionally recommends that the instrument be completed as a part of the interview process, generally taking 10 – 17 minutes for completion (p. 14). In this project it was not necessary to read through the instrument with any of the parents involved.

As many of the parents of the participants in the A-D/HD group who were attending Chidley Educational Centre were resident in remote parts of Western Australia, a number of these parents were mailed the questionnaires after completing and returning the informed consent for participation forms. In these instances the parents completed and returned the questionnaires to the author in a stamped envelope which had been provided for this purpose. In each case the parents were

encouraged in the written instructions they received (see Appendix B) to contact the author for clarification on the meaning of any questions they experienced difficulty with before completing the CBCL and returning it, a procedure which also outlined for such circumstances in the manual for the CBCL (Achenbach, 1991, p. 15).

The TRF-CBCL is intended for completion by the child's class teacher, or a suitable alternative rater in the school environment such as a school psychologist or school principal (Achenbach, 1991a, p. 11). In this research the TRF-CBCL was filled out for each participant by their classroom teacher in the case of those attending Primary Schools, or the teacher who had the greatest contact with the participant in the case of those attending District High Schools, or Chidley Educational Centre.

### **Scoring the *Child Behavior Checklist* and *Teacher Report Form of the Child Behaviour Checklist***

The *Competency Scales* and *Problem Scales* questions may be scored either by hand on a profile form or by the use of a computer program into which the raw scores and other information are entered and which then generates and prints out a profile.

For both the CBCL and the TRF-CBCL the raw scores are converted to *T-Scores* for each scale by transcribing the ratings from the questionnaire to the relevant places on the profile form. When completed the raw scores are summed to provide a total raw score on each of the *Competence* (or *Academic / Adaptive*) *Scales*, and for the *Problem Scales*. The total raw scores are also summed to provide a *Total Competence* and a *Total Problems* score.

The total raw scores are converted to *T*-scores which are then plotted on the profile. The *T*-scores have a mean value of 50 and a standard deviation of 10. The author has adhered to the provisions of the manual for the 1991 version of the CBCL in assigning *T*-scores and in their interpretation.

The *T*-scores for the *Problem Scales* were recorded and used to establish eligibility for participation in either the A-D/HD Group or the Clinical comparison group.

The interpretation of the *Problem Scales* assumes that a *T*-score of 70 or greater represented a severity of the behaviour in the uppermost 2 percent of the range for a boy of that age (i.e., at the 98<sup>th</sup> or 99<sup>th</sup> percentile). Scores of 67 to 69 are termed *borderline* and should be treated with caution in ascribing the presence or otherwise of a clinical problem on that scale (Achenbach, 1991, p. 56).

As a result, the participants assigned to the A-D/HD Group had scores of 70 or greater on the *Attention Problems Scale* on either the CBCL, the TRF-CBCL, or both, while the Clinical comparison group Participants' scores were 67 or lower. In practice there were very few potential participants who fell into the borderline range on the *Attention Problems Scale* of both the CBCL and the TRF-CBCL.

One of the original authors of the CBCL and TRF-CBCL, Edelbrock, has reported evidence that supported a change to the clinical threshold score for A-D/HD symptomatic behaviours, so that the threshold could be appropriately set at  $T = 60$  on the *Attention Problems Scale*, rather than  $T = 70$  (Edelbrock & Costello, 1988). This has not been sanctioned by subsequent publications and would in any case lead to an inflated number of cases being considered for diagnosis. This author believes it was appropriate to adhere to the most conservative level of significance for this research, and therefore chose the threshold value of  $T = 70$ .

## Structure of the *Attention Deficit Disorders Evaluation Scale*

Both forms of the ADDES have three subscales: *Inattention*, *Impulsivity*, and *Hyperactivity*. Table 5.2 shows the number of questions for each of the subscales, which vary between the two versions.

Home Version		School Version	
Inattention	19 Questions	Inattention	27 Questions
Impulsivity	15 Questions	Impulsivity	18 Questions
Hyperactivity	12 Questions	Hyperactivity	15 Questions

Table 5.2 Composition of the subscales of the ADDES.

The school form of the ADDES is longer and puts a slightly greater emphasis on *Inattention* compared to the home form of the instrument.

## Scoring the *Attention Deficit Disorders Evaluation Scales*

In completing the ADDES the rater, either parent or teacher, is asked to rate the child on each item using the previously described five point scale to indicate the frequency of the particular behaviour or behaviours. The raw score is then converted to a *Subscale Standard Score* using the

norms provided in the manual.

Separate norms are provided for both sexes and for age groups in the range 4 to 18 years of age. The *Subscale Standard Scores* are summed to yield a total score to which a percentile and percentile rank is assigned (McCarney, 1989, pp. 7 -10; 1989a, pp. 7 -10).

This quantification of each observed behaviour not only contributes to the subscale raw scores and an overall score, but is also useful in planning and selecting strategies that target specific behaviours for intervention.

- 0 - Does not engage in behaviour
- 1 - One to several times per month
- 2 - One to several times per week
- 3 - One to several times per day
- 4 - One to several times per hour

*Figure 5.2* Scoring scale for the ADDES Home and School forms.

The format of the five point scale for the quantification of the responses is shown in figure 5.2. The scale and the description of the frequency of the behaviour being rated is identical for both the home and school versions of the ADDES.

In contrast to the questions for the *Problem Scales* of the CBCL and the TRF-CBCL, individual questions of both forms of the ADDES relate only to one of the three subscale, *Inattention*, *Impulsivity*, and *Hyperactivity*.

This allows for the diagnosis of *Attention-Deficit /Hyperactivity Disorder, Predominantly Inattentive Type* children, which is a less exact process with other instruments, such as the Conners Teacher Rating Scale (Conners, 1969), which attempt to discriminate between hyperactive and non-hyperactive children, rather than A-D/HD and non – A-D/HD children *per se* (Reynolds & Stark, 1986; Schachar et al., 1986).

The ADDES provides recommendations for interventions based upon the child's scores on each of the three subscales. The type and intensity of intervention which the Intervention Manuals (McCarney, 1989b; 1989c) recommend is tied closely to the pattern of the individual's scores on the subscales. This material has been used in practice by school psychologists, including the researcher. As with any such intervention, even given that the appropriate strategy, or strategies, were selected, the amount of effort which the parents or teachers put into implementing and monitoring the programme is still one of the major factors in its eventual success.

As has been previously discussed, at this time only a few publications have appeared in which the ADDES has been considered in detail (Adesman, 1991; Barkley, 1990; Conoley & Impara, 1995; Holland, Gimpel & Merrell, 1999). The results of Adesman's study indicate that although the ADDES is useful for assessing behaviour change over time, there has been no evidence presented to support its ability to measure interval change or intervention impact. Barkley's consideration of the instrument (Barkley, 1990) also expresses reservations regarding the application of the ADDES based on its relatively recent publication at the time of his writing and the consequent lack of a supporting literature arising for the instrument.

The other citations of the ADDES in the literature similarly find it to be promising but emphasize the need of further research to establish it as an effective instrument in assessing A-D/HD (Holland, Gimpel & Merrell,



1999; M<sup>c</sup>Kinney et al. 1993; NHMRC, 1997).

On the basis of the diagnostic and clinical qualities of the ADDES, balanced by the published reviews, the author decided to use the ADDES as a second measure in conjunction with the CBCL and TRF-CBCL to establish the suitability of the children who were approached to act as participants in the research.

The use of the ADDES as an instrument in this research also enabled ratings of the severity of the observed behaviours across two separate settings to be obtained and as the instrument provides separate scores for Inattention, Hyperactivity and Impulsiveness, enables the A-D/HD participants to be separated into the three subtypes (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type* and *Combined Type*) identified in the DSM-IV (APA, 1994). This allows investigation into differences between the perceived Locus of Control of the clinical comparison group participants and the perceived Locus of Control of those diagnosed with each of the subtypes of A-D/HD, as a part of Research Objective Two, which will be discussed in chapter seven of this thesis.

### **Use of the *Nowicki and Strickland Children's Locus of Control Scale***

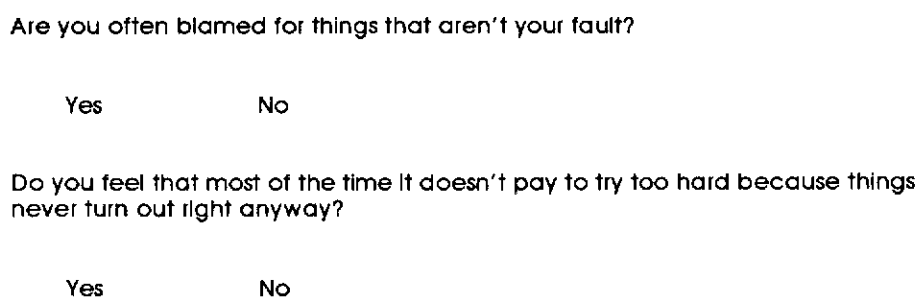
Each participant completed the Nowicki and Strickland CNS-IE. For participants where literacy was thought to be below the level required for full comprehension of the questions the instrument was read to them and their responses recorded on the response sheet.

The CNS-IE was developed to provide a valid and reliable instrument

capable of measuring children's generalized perceived Locus of Control across a range of situations and age groups, a need which was not met at the time of its development by any existing instrument.

The CNS-IE was developed as a self-response questionnaire which could be completed by children from ages 8 to 17 years, either individually or in groups. Initially, an item pool of 102 items was developed, from which 59 were finally selected for inclusion in the earliest form of the instrument (Nowicki & Strickland, 1973, p. 149). The items included were those which had been selected as indicating externality by a group of 9 clinical psychologists.

These 59 items were further reduced to the 40 comprising the final questionnaire through the analysis of the results of trial administrations on groups of children of various ages, resulting in the selection of those items which demonstrated the greatest level of homogeneity when scored in the direction of externality (Nowicki & Strickland, 1973, pp. 149 - 150). The 40 items are presented to the respondent as questions requiring a yes or no response. The format of all of the questions follows that of the examples shown in figure 5.3.



**Figure 5.3** Format of questions for the CNS-IE.

For the purposes of this research, the CNS-IE was administered individually to each participant. In those cases where the participant's reading ability was below the level required for comprehension of the scale, as indicated by questions from the participant, it was dictated to them and their oral responses were recorded on the protocol.

In general there were no difficulties with the completion of the CNS-IE due to non-comprehension of the instructions or of the content by any of the participants.

In order to provide a set of check - norms for the Western Australian population, the CNS-IE was administered to 368 classmates of the A-D/HD Participants, as described earlier in this chapter. In this instance the CNS-IE was administered as a group instrument, rather than individually.

## **5.5 The Cognitive Behavioural Intervention: *Stop, Think, Do***

All participants completed the *Stop, Think, Do* (Petersen & Gannoni, 1992) cognitive behaviour modification program in separate groups. This consisted of six 45 to 60 minute sessions over a four week period, conducted with groups of between four and six participants in each instance. *Stop, Think, Do* has been widely used in Australian schools to teach self-management skills which will enhance their acceptance of responsibility for their behaviour (Conway, 1998, p. 340).

All participants completed the *Stop, Think, Do* intervention in precisely the same manner, with the A-D/HD participants, and clinical comparison group participants in separate groups. The CNS-IE, was administered to

the clinical comparison group participants on the same day as the A-D/HD participant(s) from that classroom, and once again on the same day for the post-intervention administration.

The clinical comparison group participants were a part of the same intervention groups as the A-D/HD participants. This was done so that they received exactly the same intervention and participated in the same activities as the A-D/HD participants.

This was intended to minimise the effects of time and other variables on the group. The parents and teachers were instructed not to commence any other intervention during the program, nor to change the medication dosage, except as prescribed by the medical practitioner(s) involved. This was intended to reduce the risk of other factors confounding the results of the research.

The program was conducted by the Researcher as laid out in the *Stop, Think, Do* manual, with age adjusted programs for the 10- 12 year old groups and the 13 - 14 year olds, as specified in the *Stop, Think, Do* manual. Whenever it was possible to do so the programme was conducted twice-weekly so as to speed up the process. This is recommended in the manual, as it provides more frequent feedback to participants.

## **5.6 Conclusions**

The Participants for the research were selected either because they were boys who had been diagnosed with A-D/HD or were male classmates of such boys. The latter were to act as a control group for the A-D/HD boys.

Two instruments were completed by the parent and teachers to rate behaviours symptomatic of A-D/HD, the CBCL and ADDES (Home), and

the TRF-CBCL and ADDES (School), respectively. These instruments were completed to ensure that the participants were appropriately placed in the two groups, and, to provide quantitative data regarding their behaviour.

Each participant completed the CNS-IE measure of perceived Locus of Control both before and after the intervention.

The *Stop, Think, Do* cognitive - behavioural intervention was selected for use in the research due to its demonstrated effectiveness in managing behaviour and developing self-responsibility. Its aims and characteristics are consistent with the *Behavioural Disinhibition model* of A-D/HD, as discussed in chapter four.

Each instrument and the intervention was completed in the standardised manner appropriate to it. The Researcher is confident that the results are, therefore, valid and reliable.

The next three chapters of this thesis address the three Research Objectives stated in chapter one, providing the results of analyses and detailed discussions of them.

## **Chapter 6**

### **Behavioural Predictors of Externality of Locus of Control in Attention-Deficit/Hyperactivity Disordered Boys**

This chapter is divided into four sections, the first two of which detail those results which provide a response to Research Objective One:

*To investigate the relationship between perceived Locus of Control and attentional deficiency, with greater externality hypothesized to be associated with greater deficits in attention.*

This is followed by a discussion of the results, including the implications of the results for educational and clinical practice. The fourth and final section of the chapter is a discussion of the implications for future research raised by the results.

Chapters seven and eight will follow a similar format in addressing the second and third Research Objectives posed at the end of chapter one.

All of the statistical analyses in these three chapters were carried out using version 6.1 for Macintosh of the *Statistical Package for the Social Sciences* (SPSS) software package (Norusis, 1994).

The investigation of the first Research Objective examined the proposition that there is a positive relationship between the degree of externality of perceived Locus of Control, as measured by the CNS-IE, and the magnitude of behavioural symptoms associated with A-D/HD, as measured by the CBCL, TRF-CBCL, ADDES (Home) and ADDES (School) rating scales.

The Research Objective will be addressed on the basis of the scores of all of the participants in the research project, both those diagnosed with A-D/HD, and those in the clinical comparison group who are judged not to have A-D/HD.

The relationship between the two variables will be examined through measures of association with a view to demonstrating a significant positive relationship between scores on the measures of the two variables. It is envisaged that this will provide valuable information for making decisions regarding appropriate treatment strategies for children with A-D/HD in particular, but with possible application to a wider population of children who could benefit from the development of a more internal perceived Locus of Control.

## **6.1 Research Objective One:**

### **The Relationship Between Deficits in Attention and External Locus of Control**

Concurrent parallel measures of attentional deficit were obtained using the *Attention Problems* (Scale VI) of the CBCL, the TRF-CBCL and the *Inattention* Scale of the home and school forms of the ADDES. In each instance the ratings were completed individually by the parent(s) and teacher(s) of each of the 77 A-D/HD participants and the 23 non-A-D/HD participants nominated for the prospective intervention.

The perceived Locus of Control data for all participants was obtained from the CNS-IE questionnaire. The number of externalising responses to the questions of the CNS-IE provided by the participants quantified the degree of externality of the individual's perceived Locus of Control.

Given that A-D/HD is an aggregated behavioural phenomenon with components of inattention, hyperactivity, and impulsivity when measured by behavioural rating scales, then correlations between the CNS-IE scores and the applicable *Problem Scales* (*Social Problems*, *Aggression* and *Delinquency*) of both the CBCL and the Teacher Report Form of the CBCL as well as for the *Impulsivity Scale* and *Hyperactivity Scale* of the home and school forms of the ADDES would be expected to be found as well as the *Attention Problems* or *Inattention* scales of the instruments.

Table 6.1 details the specific scales used in the correlations to address this Research Objective.



Attention Deficit		Locus of Control
<p><i>CBCL / TRF-CBCL</i>  <i>Increasing scores signify increasing severity</i>  <i>T – Scores for:</i>                      Scale V (Social Problems)                      Scale VI (Attention Problems)                      Scale VII (Delinquency)                      Scale VIII (Aggression)                      ( <i>Table 6.2</i> )</p>	<p><i>ADDES (Home) / ADDES (School)</i>  <i>Decreasing scores signify increasing severity</i>                      Standard Scores for :                      Inattention                      Impulsivity                      Hyperactivity                      ( <i>Table 6.3</i> )</p>	<p><i>CNS-IE</i>  <i>Increasing scores signify increasing externality</i>                      Number of externalising responses (Externalising Score) pre - Intervention</p>

**Table 6.1 Summary of scales used in addressing Research Objective One.**

It must be noted that for the CBCL and the TRF-CBCL *T*-scores (mean = 50, standard deviation = 10) are used for the comparisons, with increasing scores indicate increasing severity of attentional problems. For the ADDES, on the other hand, standard scores (mean = 10, standard deviation = 2) are used for comparisons.

In this format *decreasing* scores indicate increasing severity of attentional problems, so that if there is a relationship between attentional deficit and perceived Locus of Control then for scores on the CBCL or TRF-CBCL and the CNS-IE one would expect a positive correlation to be found, whilst for the ADDES and the CNS-IE a negative relationship would be expected.

Table 6.2 presents the correlations obtained between the ratings of behaviour on the four selected CBCL and TRF-CBCL *Problem Scales* (*Attention Problems, Social Problems, Aggression and Delinquency*) and scores on the CNS-IE for both parent and teacher forms. Table 6.3 presents the correlations between scores on the CNS-IE and those on each of the three scales (*Inattention, Impulsivity, Hyperactivity*) of the ADDES, once again for the home and school forms of the instrument.

The correlations (see tables 6.2 and 6.3) indicate that there are some highly significant predictors of externalizing perceived Locus of Control, measured by the CNS-IE, among the selected scales. The correlation between the *Social Problems Scale* and the CNS-IE is nonsignificant for both teacher and parent ratings.

As the literature on perceived Locus of Control clearly indicates that scores on the CNS-IE should decrease with age, it is interesting to reexamine the correlations when age is controlled using the *partial correlation* procedure. The results of these correlations (tables 6.4 and 6.5) did not alter the significance of the original correlations, with the exception that the inverse correlation between the *Social Problems Scale*

of the CBCL-TRF and CNS-IE pre-intervention score is now significant at the .05 level. For the majority of results it appears age is not a confounding variable when considering the correlation between ADDES scales, or CBCL/CBCL-TRF scales, and scores on the CNS-IE.

For teachers the significant correlations with Locus of Control are the TRF- CBCL ratings on the *Attention Problems*, *Aggression* and *Delinquency* scales, and all three (*Inattention*, *Impulsivity* and *Hyperactivity*) scales on the ADDES (School) instrument. For parents the significant correlations with Locus of Control are the *Attention Problems*, *Aggression*, and *Delinquency* scales of the CBCL and all three scales of the ADDES (Home).

As was discussed in chapter two, teachers and parents both contribute valuable information in comparable, although not identical, ways through their ratings of behaviour.

The results of this research demonstrate that ratings of children's behaviour by teachers and parents can provide information that is much more consistent between the two groups of raters and presents a more coherent picture of the behaviours symptomatic of A-D/HD than earlier research indicated. Recent research in this area by DuPaul and his co-workers supports the findings of the present research (DuPaul et.al., 1997; DuPaul et.al., 1998).

Source	<i>n</i>	Correlation	Significance
CBCL (Attention Problems) and CNS-IE (Externalising)	100	$r = .8524^{***}$	$p = .000$
CBCL (Social Problems) and CNS-IE (Externalising)	100	$r = .0668$	$p = .509$
CBCL (Aggression) and CNS-IE (Externalising)	100	$r = .3104^{**}$	$p = .002$
CBCL (Delinquency) and CNS-IE (Externalising)	100	$r = .2879^{**}$	$p = .004$
TRF-CBCL (Attention Problems) and CNS-IE (Externalising)	100	$r = .6965^{***}$	$p = .000$
TRF-CBCL (Social Problems) and CNS-IE (Externalising)	100	$r = -.1695$	$p = .092$
TRF-CBCL (Aggression) and CNS-IE (Externalising)	100	$r = .6631^{***}$	$p = .000$
TRF-CBCL (Delinquency) and CNS-IE (Externalising)	100	$r = .3458^{***}$	$p = .000$

\*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

Table 6.2 Correlations between scores on the CBCL *Problem Scales* with the CNS-IE pre-intervention score.

Source	n	Correlation	Significance
ADDES (Home) Inattention and CNS-IE (Externalising)	100	$r = -.7522^{***}$	$p = .000$
ADDES (Home) Impulsivity and CNS-IE (Externalising)	100	$r = -.7383^{***}$	$p = .000$
ADDES (Home) Hyperactivity and CNS-IE (Externalising)	100	$r = -.7087^{***}$	$p = .000$
ADDES (School) Inattention and CNS-IE (Externalising)	100	$r = -.7637^{***}$	$p = .000$
ADDES (School) Impulsivity and CNS-IE (Externalising)	100	$r = -.7478^{***}$	$p = .000$
ADDES (School) Hyperactivity and CNS-IE (Externalising)	100	$r = -.7408^{***}$	$p = .000$

\*\*\*  $p < .001$

Table 6.3 Correlations between scores on the ADDES *Subscales* with the CNS-IE pre-intervention score.

Source	<i>n</i>	Correlation	Significance
CBCL (Attention Problems) and CNS-IE (Externalising)	97	$r = .8523^{***}$	$p = .000$
CBCL (Social Problems) and CNS-IE (Externalising)	97	$r = .0649$	$p = .262$
CBCL (Aggression) and CNS-IE (Externalising)	97	$r = .3141^{**}$	$p = .001$
CBCL (Delinquency) and CNS-IE (Externalising)	97	$r = .2877^{**}$	$p = .002$
TRF-CBCL (Attention Problems) and CNS-IE (Externalising)	97	$r = .6970^{***}$	$p = .000$
TRF-CBCL (Social Problems) and CNS-IE (Externalising)	97	$r = -.1695$	$p = .047$
TRF-CBCL (Aggression) and CNS-IE (Externalising)	97	$r = .6629^{***}$	$p = .000$
TRF-CBCL (Delinquency) and CNS-IE (Externalising)	97	$r = .3464^{***}$	$p = .000$

\*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

Table 6.4 Partial correlations between scores on the CBCL *Problem Scales* with the CNS-IE pre-intervention score, controlling for age.

Source	<i>n</i>	Correlation	Significance
ADDES (Home) Inattention and CNS-IE (Externalising)	100	$r = -.7521^{***}$	$p = .000$
ADDES (Home) Impulsivity and CNS-IE (Externalising)	100	$r = -.7400^{***}$	$p = .000$
ADDES (Home) Hyperactivity and CNS-IE (Externalising)	100	$r = -.7129^{***}$	$p = .000$
ADDES (School) Inattention and CNS-IE (Externalising)	100	$r = -.7636^{***}$	$p = .000$
ADDES (School) Impulsivity and CNS-IE (Externalising)	100	$r = -.7479^{***}$	$p = .000$
ADDES (School) Hyperactivity and CNS-IE (Externalising)	100	$r = -.7410^{***}$	$p = .000$

\*\*\*  $p < .001$

Table 6.5 Partial correlations between scores on the ADDES *Subscales* with the CNS-IE pre-intervention score, controlling for age.

It appears from these results that, with the exception of parent and teacher ratings of social problems, there is the possibility of a significant correlation between scores on the measure of perceived Locus of Control and those of behaviours symptomatic of A-D/HD. This indicates that there may be a relationship between attentional deficits and external perceived Locus of Control, as measured by the instruments used. The results appear to provide an affirmative response to Research Objective One, that is, greater deficits in attention appear to be associated with increasing externality of perceived Locus of Control among boys aged 8 to 14 years diagnosed with A-D/HD. The results tend to support the assertion that the relationship is evident both at home and at school, even though teachers and parents may focus on slightly different aspects or components of A-D/HD symptomatology.

## **6.2 Multiple Regression Analyses of Scores on Measures of Participants' Behaviours: Prediction of Perceived Locus of Control**

In view of the number of bivariate and partial correlations that were observed to be significant, it was decided to conduct multiple regression analyses that would further explore the relationship between attentional deficits, other behaviours associated with A-D/HD and externality of perceived Locus of Control.

The pre-intervention CNS-IE score, measuring perceived external Locus of Control, remained constant as the outcome variable in each equation, whilst the predictor variables consisted of four *Problem Scale* scales for each of the CBCL and TRF-CBCL, and the three scales of each form of the ADDES. The other *Problem Scales* from the CBCL forms do not



relate to behaviours which can be considered to relate to A-D/HD and will not be considered as a part of the regression analyses.

Tables 6.6 to 6.9 contain the results of the analyses for the CBCL and the TRF-CBCL, separately and then combined. Tables 6.10 to 6.13 contain those for the CBCL and the home form of the ADDES and the TRF-CBCL and the school form of the ADDES respectively.

Table 6.14 presents the results of the linear regressions for the scores on all four A-D/HD instruments combined predicting the CNS-IE scores. The associated plots in figures 6.1 to 6.8 present the results of the regression analyses in a graphical format.

### **Multiple Regression of Parent Ratings of Behaviour on the CBCL *Problem Scales* Predicting CNS-IE Scores**

Section 6.1 of this chapter examined the correlations between CNS-IE scores and the *T*-scores of ratings of behaviour on the CBCL. Of the four CBCL *Problem Scales* from the parent form of the CBCL which the literature indicates relate to A-D/HD, only *Social Problems* was shown *not* to be significantly correlated with external perceived Locus of Control scores.

Parents' rating of inattention, aggression and delinquency, which measure attentional deficits, non-compliance and disruptiveness, all of which are behaviours symptomatic of A-D/HD are, therefore, strongly correlated with the level of externality of the perceived Locus of Control

of their children. It is logical to question, therefore, whether the combination of two or more of these *Problems Scale* scores will increase the accuracy with which CNS-IE scores can be predicted.

When the four *Problem Scale* scores of the CBCL are examined in combination the regression equation that predicts the CNS-IE score from these four *Problem Scales* of the CBCL is:

$$\text{CNS-IE} = -9.370 + 0.487 (\textit{Attention Problems})$$

Equation 1: CBCL *Problem Scales*

The unstandardised coefficients of the other three *Problem Scales* are below the threshold of significance ( $p < .05$ ). Table 6.4 contains the results of the regression equation stated above.

The equation and the results of the regression analysis demonstrate that although the other three *Problem Scales* (*Social Problems*, *Delinquency*, *Aggression*) of the CBCL scores used in the analysis are individually significantly correlated with boys' scores on the CNS-IE scale, they do not significantly add to the prediction of external perceived Locus of Control scores on the CNS-IE when considered in association with the *Attention Problems* score as a part of the regression equation.

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	-9.370	3.479		-2.693	.008
CBCL Social Problems	-.006	.032	-.106	-1.950	.054
CBCL Attention Problems	.487	.033	.848	14.844 ***	.000
CBCL Delinquency	.003	.037	.046	.827	.411
CBCL Aggression	.002	.034	.046	.823	.412

\*\*\*  $p < .001$

Table 6.6 Summary table for the linear regression of the CBCL *Problem Scale* ratings of behaviour predicting CNS-IE score pre-intervention.

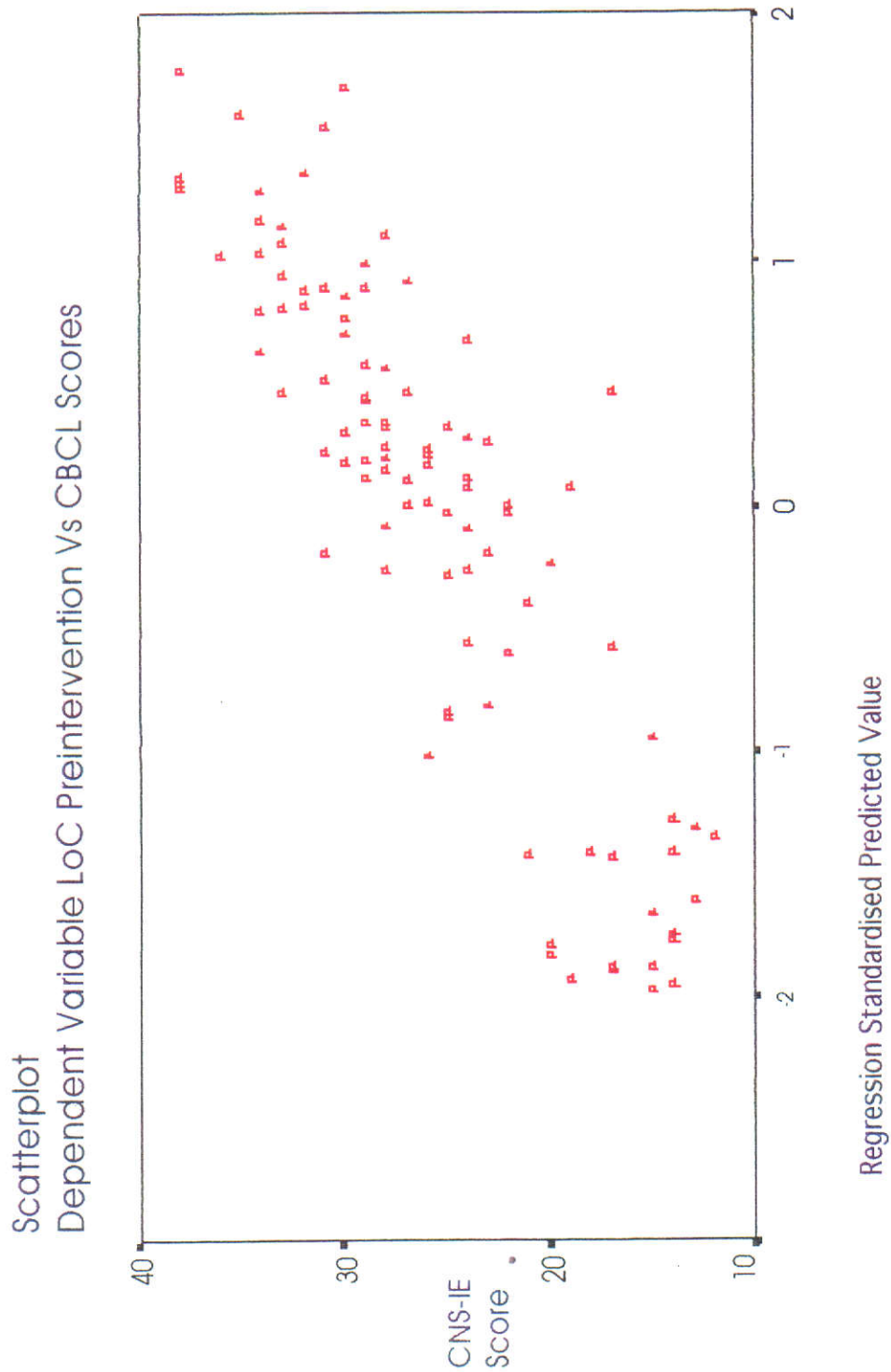


Figure 6.1 Scatterplot of the regression equation for CBCL *Problem Scale* scores predicting CNS-IE pre-intervention score.

The conclusion that can be drawn from these results is that individuals with high levels of externality of perceived Locus of Control tend to be scored highly by their parents on the *Attentional Problems* Scale of the CBCL, and thus the most salient predictor of externality from the perspective of parent raters using this instrument is their rating of attentional difficulties.

### **Multiple Regression of Teacher Ratings of Behaviour on the TRF-CBCL *Problem Scales* Predicting CNS-IE Scores**

The second multiple regression equation to be considered has as its independent variables the four *Problem Scales* used from the TRF-CBCL ratings of behaviour completed by the participants' teachers. The results are shown in Table 6.5. The regression equation that predicts the CNS-IE score using the four *Problem Scales* of the TRF-CBCL is:

$$\text{CNS-IE} = -7.088 + 0.285 (\textit{Attention Problems}) + 0.195 (\textit{Aggression})$$

#### **Equation 2. TRF-CBCL *Problem Scales***

The results of the regression analysis indicate that TRF-CBCL scores on the *Attention Problems* and *Aggression* scales of the instrument are very strong predictors of the participants' degree of externality of Locus of Control, when teacher's ratings of behaviour are examined. The other two *Problem Scales* (*Social Problems* and *Delinquency*), on the other hand, did not contribute significantly to the prediction of CNS-IE score in this instance.

The one noticeable difference between the regression equations for parent and teacher ratings is the addition of the *Aggression* Scale in the

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	-7.088	4.264		-1.662	.100
TRF-CBCL Social Problems	-.005	.037	-.105	-1.539	.127
TRF-CBCL Attention Problems	.285	.050	.468	5.651 ***	.000
TRF-CBCL Delinquency	.002	.050	.034	.434	.665
TRF-CBCL Aggression	.195	.034	.351	3.864***	.000

\*\*\*  $p < .001$

**Table 6.7:** Summary table for the linear regression of the TRF-CBCL *Problem Scale* ratings of behaviour predicting CNS-IE score pre-intervention.

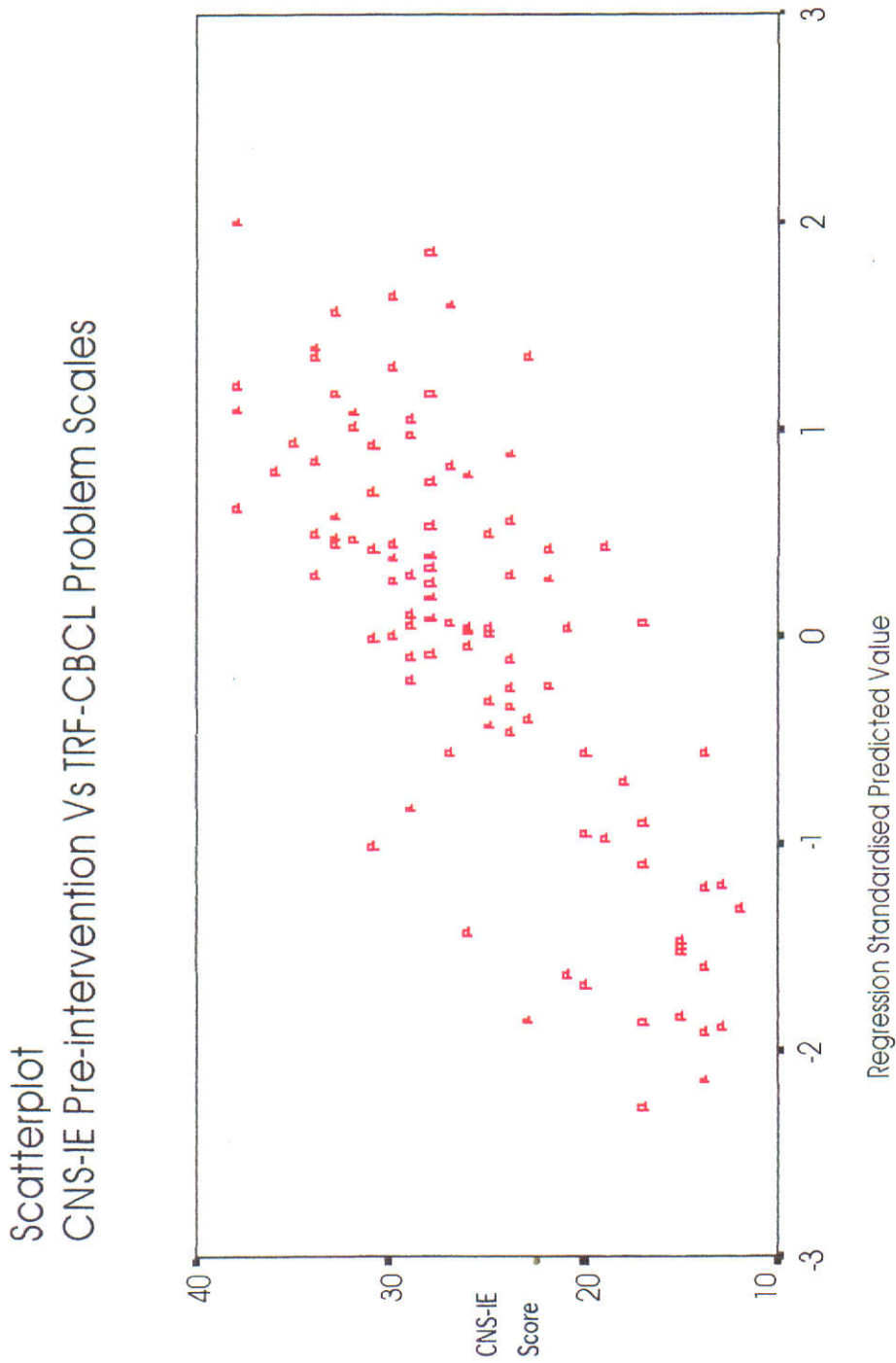


Figure 6.2 Scatterplot of the regression equation for TRF-CBCL Problem Scale scores predicting CNS-IE pre-intervention score.

equation for the TRF-CBCL regression analysis. The reason for the significance of aggression for teachers as opposed to parents may well be that aggression is manifested more frequently in the classroom, a setting which usually has more members and thus more varied interpersonal interactions, than does the family home. Teachers, therefore, may well be more likely to be sensitive to aggressive behaviour that signals potential disruption in their environment.

These differences in the regression analyses between the parent and teacher ratings of behaviours may indicate that teachers are more aware of those behaviours which impact on the dynamics of the classroom or playground, such as aggressive behaviours, than are parents, who may deal with the child in situations where such behaviours are less likely to be manifested, or are less likely to escalate into class-wide disputes and disruption. Teachers are often more aware of the quality and nature of peer interactions with a wider variety of children than are their parents (Marks, Himmelstein, Newcorn & Halperin, 1999).

The teacher rater, therefore, is responding to a boy who, from the teacher's perspective, is inattentive, aggressive towards other class members, and rarely accepts responsibility for controlling his own behaviour.

Given this unattractive constellation of perceptions, it is not difficult to understand the antagonism expressed by many teachers towards these boys. The likelihood of teachers regarding them sympathetically, or working intensively towards improving the behaviour of such a boy is, therefore, minimal.

The salience of inattentive behaviour for parents is apparent and has been found in the past by other studies (Carlson, Jacobitz & Sroufe, 1995; Lahey et al., 1994; McGee, Williams & Feehan, 1992) when one considers that even for a solitary child, failure to attend to instructions, commands and parent exhortations is experienced as highly frustrating and memorable.



From the parent's perspective, their son is infuriatingly inattentive and fails to develop the expected increasing independence, responsibility, and self-control expected of them and seen in their siblings.

The discrepancies in the views of parent and teacher raters is one which has received considerable attention in the literature, particularly with regard to the appropriateness of the diagnostic methods and criteria for A-D/HD which have been applied by practitioners (Barkley, 1995; Edwards & Barkley, 1997; NHMRC, 1997). The implications of the results of this study for the assessment and treatment of children who may have A-D/HD will be discussed in more detail in the concluding chapters of this thesis.

### **Multiple Regression of Parent and Teacher Ratings of Behaviours using the CBCL and TRF-CBCL Problem Scales Scores Predicting CNS-IE Scores**

The third regression equation combines the four externalizing *Problem Scales* of the CBCL (*Social Problems, Attention Problems, Aggression and Delinquency*) and the same four *Problem Scales* of the TRF-CBCL, to examine the contributions to prediction of the perceived Locus of Control score on the CNS-IE made by the ratings of both parents and teachers on these instruments. The results of the equation are shown in table 6.6 and figure 6.3.

The regression equation that predicts the CNS-IE score from these four externalizing *Problem Scales* of both the CBCL and the TRF-CBCL is:

$$\text{CNS-IE} = -11.480 + 0.46 (\text{CBCL } \textit{Attention Problems})$$

Equation 3. CBCL and TRF- CBCL *Problem Scales*

In this equation the *Attention Problems* scale of the CBCL *Problem Scales* is the only significant ( $p < .05$ ) contributing variable to the

**Behavioural Predictors of Externality of Locus of Control**

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	-11.480	3.590		3.198	.002
CBCL Social Problems	-.006	.047	-.105	-1.327	.188
CBCL Attention Problems	.387	.046	.674	8.506 ***	.000
CBCL Delinquency	.002	.036	.028	.503	.616
CBCL Aggression	-.001	.036	-.025	-.420	.675
TRF-CBCL Social Problems	-.002	.039	-.036	-.499	.619
TRF-CBCL Attention Problems	.008	.051	.135	1.603	.112
TRF-CBCL Delinquency	.005	.040	.080	1.276	.205
TRF-CBCL Aggression	.006	.043	.118	1.538	.127

\*\*\*  $p < .001$

Table 6.8 Summary table for the linear regression of the CBCL and TRF-CBCL *Problem Scale* ratings of behaviour predicting CNS-IE score pre-intervention.

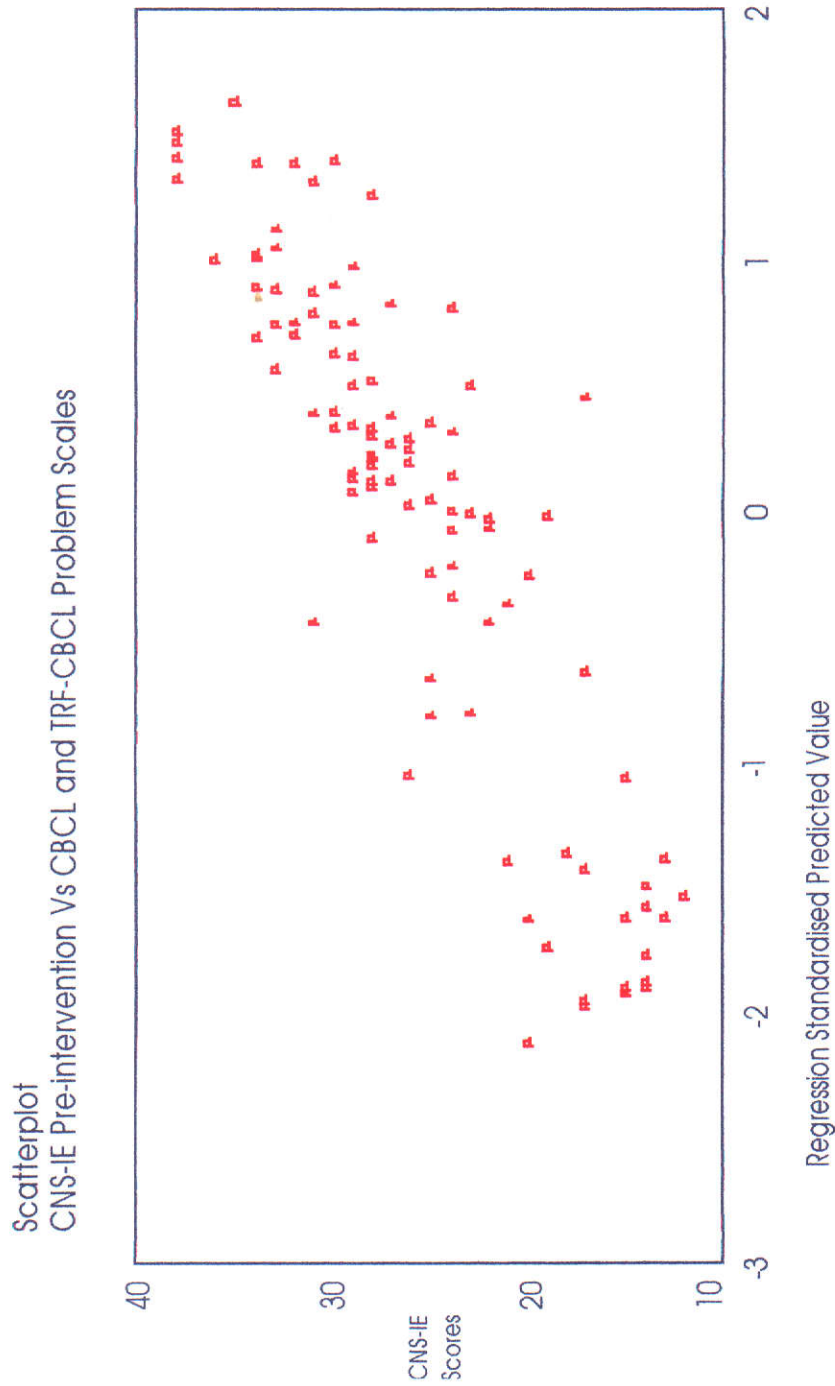


Figure 6.3 Scatterplot of the regression equation for CBCL and TRF-CBCL Problem Scale scores predicting CNS-IE pre-intervention score.

equation.

The results of the regression analysis show that the parent rating of *Attention Problems* on the CBCL is the single best predictor of externality of perceived Locus of Control among the eight ratings considered. The other *Problem Scales* of the CBCL, in both the parent and teacher forms, do not add significantly to the power of prediction made on the basis of the parent ratings on the *Attention Problems* scale. These results again underline the salience of parent observations of inattention in association with the participants' perceived Locus of Control. This issue will be further pursued in chapter eight.

### **Multiple Regression of Parent Ratings of Behaviour on the ADDES (Home) Form Predicting CNS-IE Scores**

The ratings of behaviour from the two forms (home and school) of the ADDES are next to be considered as predictors of the degree of externality of perceived Locus of Control.

This section presents the regression analysis for the parent (Home) form of the instrument. The next two sections will examine the teacher (School) form and then the two forms combined, respectively. The regression equation examines the prediction of perceived Locus of Control scores on the CNS-IE from the ratings of behaviours on the three ADDES (Home) scales, as shown in table 6.7 and figure 6.4.

$$\text{CNS-IE} = 29.820 + 0.306 (\text{ADDES } \textit{Inattention})$$

Equation 4. ADDES Home Scales

**Behavioural Predictors of Externality of Locus of Control**

	Unstandardised Coefficients		Standardised Coefficients ( $\beta$ )	<i>t</i>	Significance ( <i>p</i> )
	B	Std Error			
(Constant)	29.820	.590		50.505	.000
ADDES (Home) Inattention	-.778	.306	-.494	-2.716	.008**
ADDES (Home) Impulsivity	-.509	.306	-.377	-1.665	.099
ADDES (Home) Hyperactivity	.086	.590	.055	.281	.779

\*\*  $p < .01$

**Table 6.9** Summary table for the linear regression of the ADDES (Home) scales ratings of behaviour predicting CNS-IE score pre-intervention.

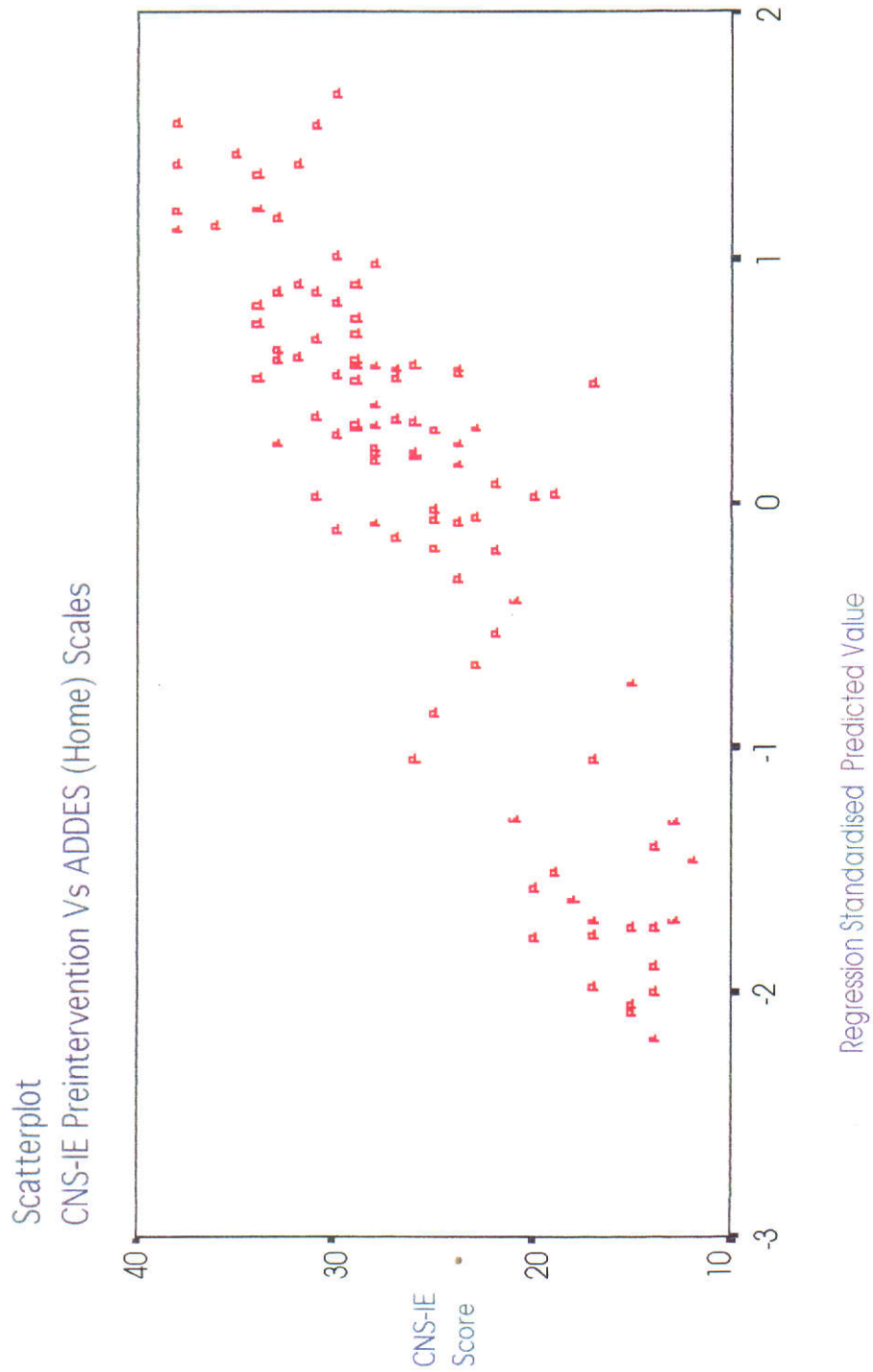


Figure 6.4 Scatterplot of the regression equation for ADDES (Home) scales scores predicting CNS-IE pre-intervention score.

The *Inattention* scale of the ADDES is the only significant ( $p < .05$ ) variable and is, therefore, the only one listed in the equation.

The results of the regression equation for the three ADDES (Home) Scales indicate that only the *Inattention* scale is a significant predictor of CNS-IE scores, and thus, externality of perceived Locus of Control. This is consistent with the results obtained for the prediction of CNS-IE scores from the CBCL, where the *Attention Problems* scale was the only rating which was a significant predictor of CNS-IE score.

These results tend to support the relationship between behaviours indicative of poor attentional abilities and externality of perceived Locus of Control when rated by parents. The psychometric value of the ADDES instrument is also confirmed by the consistency of these results.

### **Multiple Regression of Teacher Ratings of Behaviour on the ADDES (School) Form Predicting CNS-IE Scores**

Similarly to the previous analysis, the three scales (*Inattention*, *Hyperactivity*, *Impulsivity*) of the school form of the ADDES were examined to assess the extent to which these ratings of behaviour by teachers predict the level of externality of perceived Locus of Control. This fifth regression equation examines the prediction of perceived Locus of Control scores on the CNS-IE from the teacher ratings of behaviours on the three ADDES (School) scales. The results of the analysis are shown in table 6.8 and figure 6.5.

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	30.068	.562		53.536	.000
ADDES (School) Inattention	-.570	.274	-.387	-2.077	.040*
ADDES (School) Impulsivity	-.358	.285	-.221	-1.259	.211
ADDES (School) Hyperactivity	-.280	.244	-.191	-1.149	.253

\*  $p < .05$

Table 6.10 Summary table for the linear regression of the ADDES (School) scales rating of behaviour predicting CNS-IE pre-intervention score.



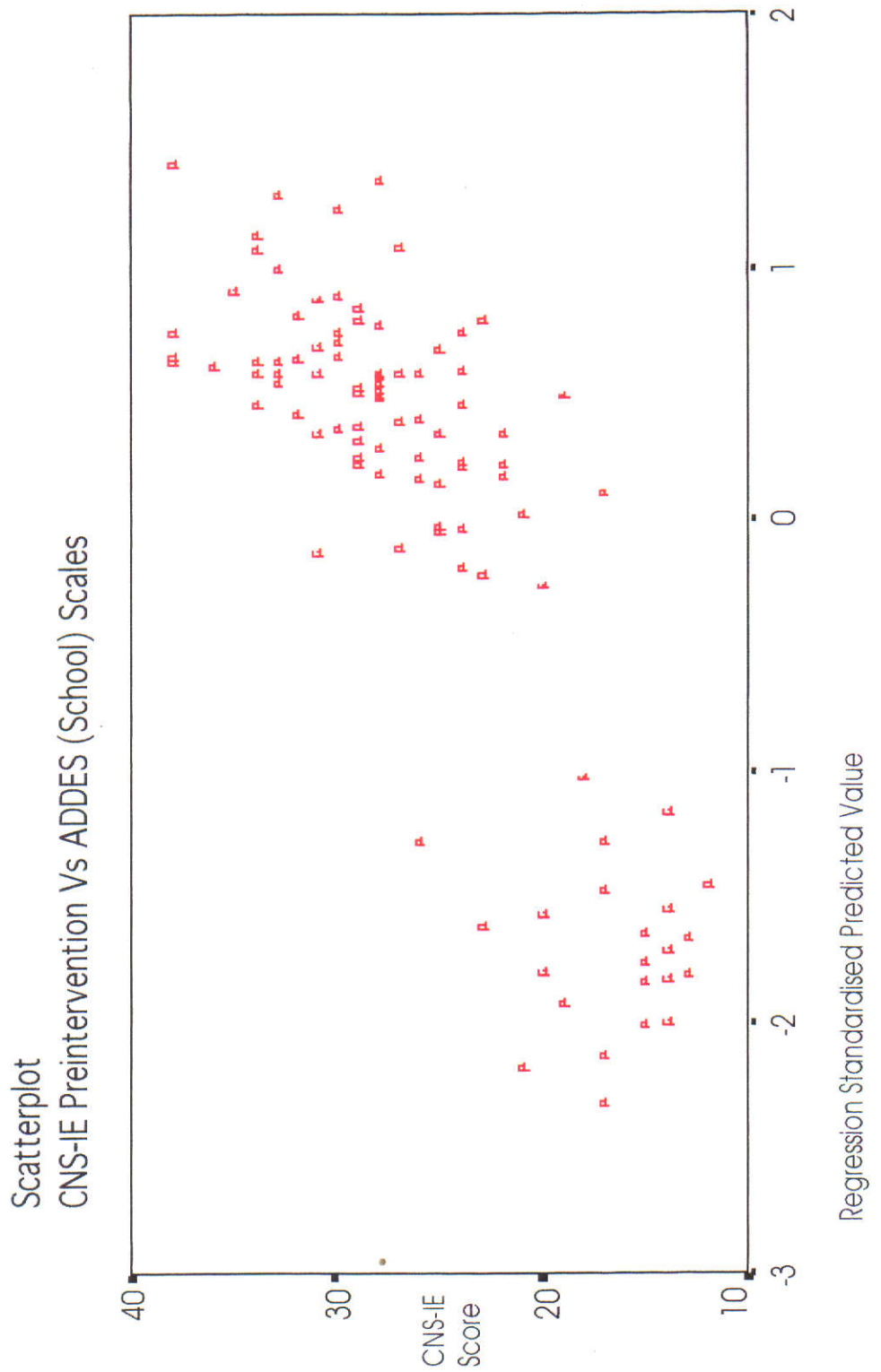


Figure 6.5 Scatterplot of regression equation for ADDES (School) scales scores predicting CNS-IE pre-intervention score.

$$\text{CNS-IE} = 30.820 - 0.358 (\text{ADDES } \textit{Inattention})$$

#### Equation 5. ADDES (School) Scales

The *Inattention* scale of school form of the ADDES is the only significant ( $p < .05$ ) variable and thus is the only one in the equation.

As with the parent form of the ADDES, the regression analysis for the teacher form demonstrates that the rating of inattentive behaviours is the only significant variable in predicting the child's perceived Locus of Control from the ADDES rating scale. Ratings of impulsivity and hyperactivity do not significantly add any predictive power to the regression equations.

The next equation examines the predictions made on the basis of ratings on the three scales of both the parent and teacher forms of the ADDES.

### **Multiple Regression of Parent and Teacher Ratings of Behaviour on the ADDES Predicting CNS-IE Scores**

For this analysis, the three scales (*Inattention*, *Hyperactivity*, *Impulsivity*) of both the parent and teacher forms of the ADDES were examined to assess the extent to which these ratings of behaviour predict the level of externality of perceived Locus of Control.

There appear to be no single outstanding predictors of perceived Locus of Control scores when both ADDES forms are combined, with all subscales contributing a similar variance to the data. Table 6.9 shows the results of the analysis.

**Behavioural Predictors of Externality of Locus of Control**

	Unstandardised Coefficients		Standardised Coefficients (β)	F	Significance (p)
	B	Std Error			
(Constant)	29.969	.586		51.175	.000
ADDES (Home) Inattention	-.401	.314	-.254	-1.276	.205
ADDES (Home) Impulsivity	-.069	.342	-.046	-0.202	.840
ADDES (Home) Hyperactivity	-.262	.316	-.168	.831	.408
ADDES (School) Inattention	-.459	.308	-.312	-1.489	.140
ADDES (School) Impulsivity	-.308	.309	-.189	-.996	.3217
ADDES (School) Hyperactivity	-.246	-.279	-.168	-.884	.379

Table 6.11 Summary table for the linear regression of the ADDES (Home & School) scales ratings of behaviour predicting CNS-IE score pre-intervention.

## **Multiple Regression of Parent Ratings of Behaviour on the CBCL and the ADDES Predicting CNS-IE Score**

For this analysis, the three scales (*Inattention, Hyperactivity, Impulsivity*) of the parent form of the ADDES and the four *Problem Scales* (*Social Problems, Attention Problems, Aggression and Delinquency*) of the CBCL were examined in a single regression equation.

This regression equation, shown in table 6.10 and figure 6.6 examines the prediction of perceived Locus of Control scores on the CNS-IE from ratings of behaviours on the four *Problem Scales* of the parent CBCL and the three ADDES scales. In this equation, there are only two statistically significant ( $p < .05$ ) variables.

$$\text{CNS-IE} = -2.649 + 0.432 (\text{CBCL } \textit{Attention Problems}) - 0.00728 (\text{CBCL } \textit{Social Problems})$$

### Equation 7. ADDES (Home) and CBCL *Problem Scales*

The results of the regression analysis of the four CBCL and three ADDES scales of the parent form of these instruments demonstrate again that the *Attention Problems* scale of the CBCL is a significant predictor of externality of perceived Locus of Control amongst the variables examined. The *Social Problems* scale also contributes to the equation. When used in conjunction with the CBCL none of the ADDES scales significantly increase the prediction of scores on the CNS-IE.

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	-2.649	5.900		-.449	.655
CBCL Social Problems	-.007	.033	-.122	-2.240*	.028
CBCL Attention Problems	.432	.055	.752	7.913***	.000
CBCL Delinquency	.002	.036	.027	.477	.635
CBCL Aggression	.001	.033	.026	.464	.643
ADDES (Home) Inattention	-.301	.228	-.191	-1.318	.191
ADDES (Home) Impulsivity	-.385	.241	-.255	-1.594	.114
ADDES (Home) Hyperactivity	.482	.244	.308	1.977	.051

\*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

Table 6.12 Summary table for the linear regression of the CBCL *Problem Scale* and ADDES (Home) scales ratings of behaviour predicting CNS-IE score pre-intervention.

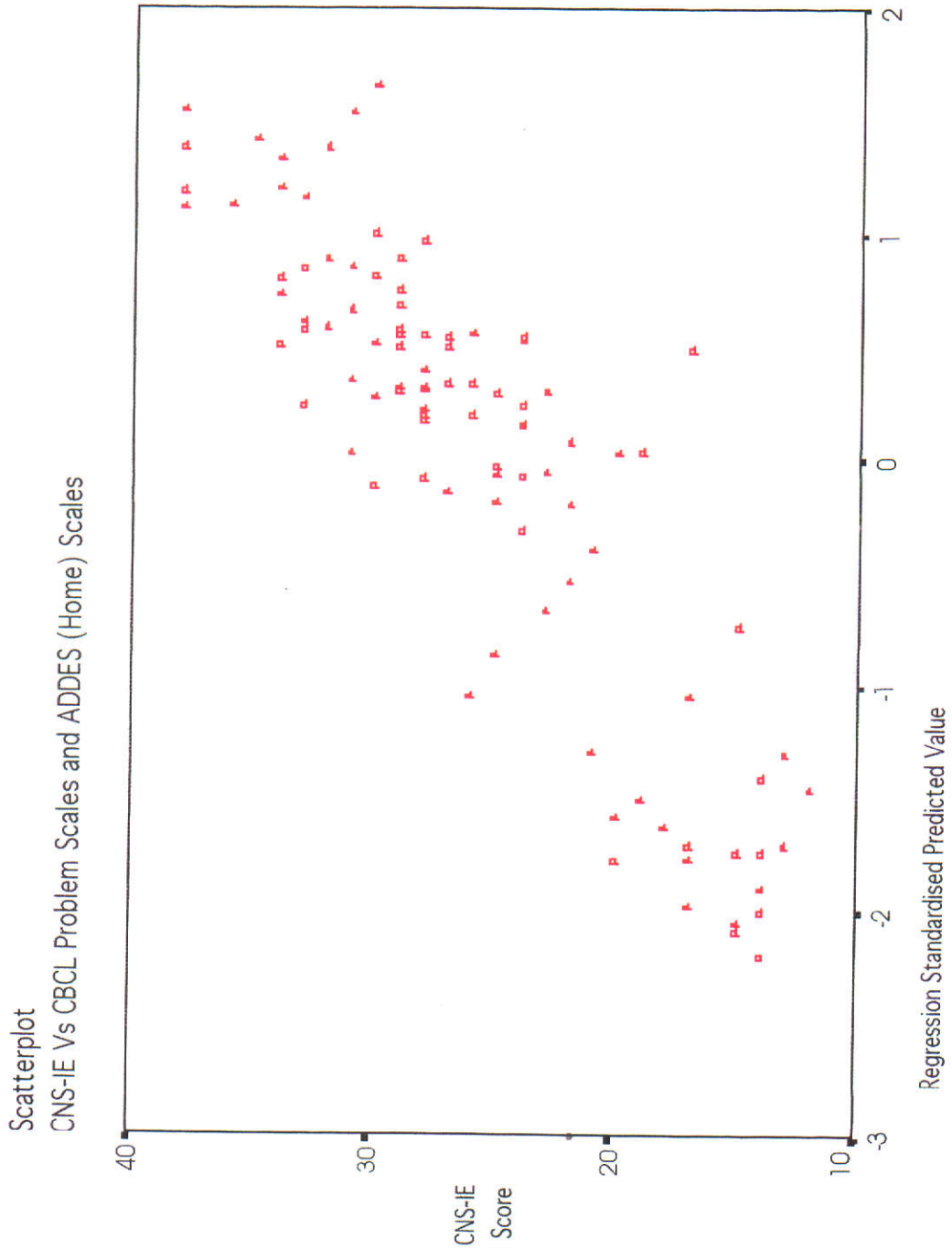


Figure 6.6 Scatterplot of the regression equation for CBCL Problem Scale and ADDES (Home) scales scores predicting CNS-IE pre-intervention score.

## **Multiple Regression of Teacher Ratings of Behaviour on the Teacher Report Form of the CBCL and the ADDES Predicting CNS-IE Score**

Similarly to the previous analysis, this regression equation examines the prediction of externality of perceived Locus of Control using both of the behaviour rating scales completed by the A-D/HD participants' teachers, the TRF-CBCL and the ADDES (School).

This regression equation, shown in table 6.13 and figure 6.7, examines the prediction of perceived Locus of Control scores on the CNS-IE from ratings of behaviours on the four *Problem Scales* of the Teacher Report Form of the CBCL and the three ADDES scales. For this equation, there is only one statistically significant ( $p < .05$ ) variable, the *Aggression Problem Scale* from the CBCL (School) instrument.

$$\text{CNS-IE} = 14.255 + 0.139 (\text{Teacher Report Form of the CBCL } \textit{Aggression})$$

Equation 8. ADDES (Home) and Teacher Report Form of the CBCL *Problem Scales*

The regression analysis of the two teacher ratings of behaviour provides only one significant predictor of CNS-IE score, the *Aggression Problem Scale* on the TRF-CBCL. As with the equivalent parent forms, none of the scales of the ADDES add significantly to the prediction of the participants' externality of perceived Locus of Control when considered in the same equation as the TRF-CBCL form.

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	14.255	6.094		2.339	.021
TRF-CBCL Social Problems	.004	.034	-.084	-1.337	.185
TRF-CBCL Attention Problems	.007	.066	.121	1.110	.270
TRF-CBCL Delinquency	.003	.046	.044	.624	.534
TRF-CBCL Aggression	.139	.048	.250	2.902**	.005
ADDES (School) Inattention	-.434	.264	-.295	-1.647	.103
ADDES (School) Impulsivity	-.233	.272	-.143	-.857	.394
ADDES (School) Hyperactivity	-.113	.240	-.077	-.471	.639

\*\* p < .01

**Table 6.13** Summary table for the linear regression of the TRF-CBCL *Problem Scales* and ADDES (School) scales ratings of behaviour predicting CNS-IE score pre-intervention.



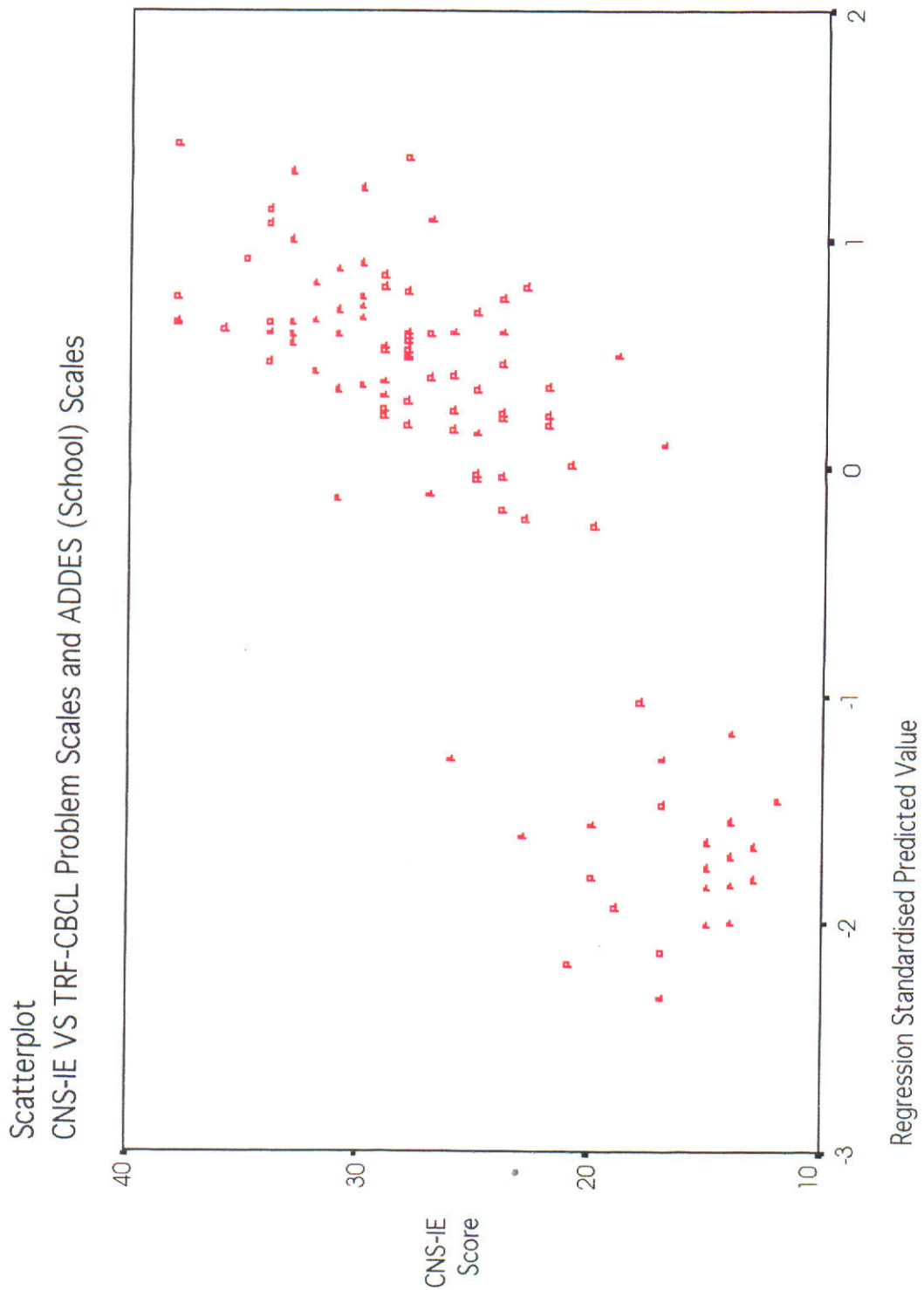


Figure 6.7 Scatterplot of the regression equation for TRF-CBCL Problem Scale and ADDES (School) scales scores predicting CNS-IE pre-intervention score.

## Multiple Regression of Parent and Teacher Ratings of Behaviour on the CBCL and the ADDES Predicting CNS-IE Score

This final regression analysis examines the prediction of externality of perceived Locus of Control using all four instruments, parent and teacher forms of the CBCL and the ADDES. The results are shown in table 6.12 and figure 6.7.

This regression equation examines the prediction of perceived Locus of Control scores on the CNS-IE from ratings of behaviours on the four *Problem Scales* of the CBCL and the three ADDES scales for both sets of raters. For this equation, there are two significant ( $p < .05$ ) variables, the *Attention Problems* scale from the CBCL and the *Hyperactivity* scale of the parent form of the ADDES.

$$\text{CNS-IE} = -7.726 + 0.373 (\text{CBCL } \textit{Attention Problems}) - 0.525 (\text{ADDES (Home) } \textit{Hyperactivity})$$

Equation 9. Parent and Teacher ADDES and CBCL *Problem Scales*

The results of the final regression analysis are that the parent (CBCL) rating on *Attention Problems* and the ADDES (Home) *Hyperactivity* scale are the only significant predictors of externality of perceived Locus of Control, when all four behaviour rating scales are considered in the same equation. These findings suggest, somewhat surprisingly, that the parental ratings of inattention, particularly on the CBCL remain the best single predictor for the externality of perceived Locus of Control of the measures of attentional deficit used in this research. This was the case for each regression equation in which parent ratings were used.

The implications of this will be discussed in the next chapter.

**Behavioural Predictors of Externality of Locus of Control**

	Unstandardised Coefficients		Standardised Coefficients (β)	t	Significance (p)
	B	Std Error			
(Constant)	-7.726	6.662		-1.160	.249
CBCL Social Problems	-.009	.050	-.147	-1.768	.081
CBCL Attention Problems	.373	.058	.650	6.470 ***	.000
CBCL Delinquency	.007	.037	.011	.191	.849
CBCL Aggression	-.002	.037	-.037	-.591	.556
TRF-CBCL Social Problems	.001	.042	.021	.275	.784
TRF-CBCL Attention Problems	.006	.059	.091	.939	.350
TRF-CBCL Delinquency	.005	.041	.083	1.305	.195
TRF-CBCL Aggression	.007	.043	.120	1.540	.127
ADDES (Home) Inattention	-.237	.255	-.150	-.929	.355
ADDES (Home) Impulsivity	-.277	.276	-.183	-1.004	.318
ADDES (Home) Hyperactivity	.525	.257	.335	2.041 *	.044
ADDES (School) Inattention	-.129	.253	-.088	-.509	.612
ADDES (School) Impulsivity	.002	.247	.012	.078	.938
ADDES (School) Hyperactivity	-.003	.231	-.020	-.126	.900

\*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

Table 6.14 Summary table for the linear regression of the CBCL and TRF-CBCL *Problem Scales* and ADDES (Home & School) scales ratings of behaviour predicting CNS-IE score pre-intervention.

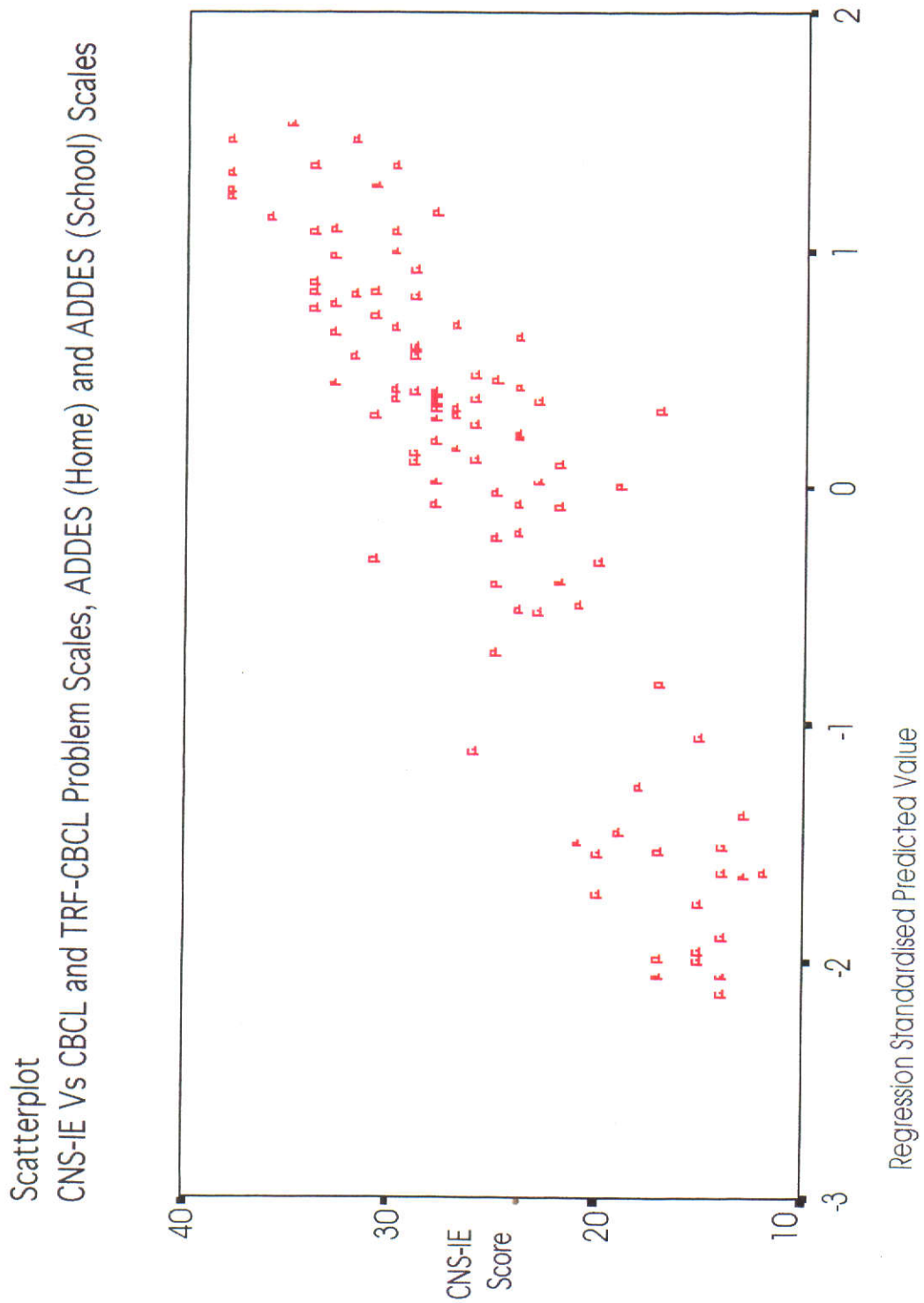


Figure 6.8 Scatterplot of the regression equation for CBCL and TRF-CBCL Problem Scales, ADDES (Home, School) scales scores predicting CNS-IE pre-intervention score.

### **6.3 Relationships Between Attention - Deficit / Hyperactivity Disorder and Perceived Locus of Control**

The results of the analyses carried out show statistically significant correlations, for the participants, between most of the measures of the behaviours typical of A-D/HD using the CBCL, TRF-CBCL and both the home and the school forms of the ADDES, and externalising perceived Locus of Control, as measured by the CNS-IE.

Bearing in mind the limitations of the present study, these results tend to confirm and extend those of Linn and Hodge (1982) and Lufi and Parrish-Plass (1995), who found that A-D/HD participants, undifferentiated by subtype, were significantly more external in their perceived Locus of Control than were otherwise comparable groups of non-A-D/HD participants.

Examination of the ADDES, CBCL and TRF-CBCL scores in combination using linear regression found that there were some benefits to be gained from combining teacher and parent ratings of behaviour in terms of their prediction of external perceived Locus of Control scores from measures of inattention, impulsiveness and hyperactivity, but these were not unexpected nor were they able to offer much greater predictive power than the individual analyses. Such benefits as arise from the regression analyses do however highlight the collaborative rôle of both parents and teachers in diagnosing A-D/HD in the current literature (APA, 1994; Bailey & Curtis, 1997; Barkley, 1995; Barkley & Edwards, 1997; Jordan, 1992; NHMRC, 1997). Across all of the analyses conducted scores on the *Attention Problems Scale* of the CBCL were consistently the most highly significant, and hence the best predictors of, externalised perceived Locus of Control in all of the participants. There is, therefore, an emerging

picture of assessment when children present with behavioural difficulties.

Among the teacher ratings, the *Attention Problems Scale* and *Aggressive Behaviors Scale* of the TRF-CBCL were highly correlated with external perceived Locus of Control. The *Attention Problems Scale*, however, was not a significant predictor when all of the teacher ratings were considered as a part of the regression equation (table 6. 11, figure 6.7).

The parent ratings of *Hyperactivity* on the ADDES and *Attention Problems* on the CBCL were the only significant predictors of externalising perceived Locus of Control when all of the ratings that had been collected on the participants were considered jointly. From these results, the conclusion that must be drawn is that parent's rating of inattention using the CBCL is the single most valuable behavioural rating predicting externality of perceived Locus of Control, at least for those boys involved in the research. It follows from these results that the use of the CBCL and TRF-CBCL with parents and teachers should be recommended if there is some question as to the specific diagnosis, e.g.; Conduct Disorder, Depression, A-D/HD.

Secondly, the ADDES should be used to establish whether or not A-D/HD symptomatic behaviours are present at a clinically significant level, and can also be used as a part of the process put in place to establish which of the three subtypes (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Combined Type*) of A-D/HD, as presently conceptualized, is present. This is useful as a part of the referral process and in determining whether a medical intervention (stimulant, or other, medication is required). It is also useful in establishing an appropriate behaviour management program, based on the identified needs of the child.

Thirdly, parents and teachers can have some confidence that scores on

the *Attention Problems* scales of the CBCL and TRF-CBCL, and the *Inattention* scale of the ADDES reflect high externality of perceived Locus of Control and therefore self-regulation must be an important component of subsequent programs. Given this it is not necessary to repeatedly use the CNS-IE to monitor progress in changing perceived Locus of Control; the appropriate scales of the CBCL and ADDES can be used to rate observable changes in behaviour, which would be expected to occur as a result of changes in the externality of perceived Locus of Control.

These findings are particularly interesting given the debate in the literature over whether parent or teacher ratings provide the most consistent indicators of behaviours symptomatic of A-D/HD (Barkley, 1990; 1995; Jordan, 1992; Milich & Fitzgerald, 1985; NHMRC, 1997; Schachar, Sandberg & Rutter, 1986). In the context of this research the focus has been on the prediction of these ratings of externality of perceived Locus of Control, rather than the diagnosis of A-D/HD *per se*. Indeed, participants in the A-D/HD group were selected on the basis of clinical range scores from both parents and teachers.

The results, whilst answering the first Research Objective, also raise a further question: Why are attentional problems, social problems, and aggressive behaviour the most likely to signal external perceived Locus of Control?

The relationship between attentional status and externality of perceived Locus of Control confirms the original hypothesis, that children with fewest attentional resources tend to fail to detect the usual connections between actions and consequences. The consequences therefore appear to be delivered randomly by external agencies of control.

Social problems and aggression are concomitants of attentional deficits in children. The repeated inability to establish and maintain friendships

may lead children to believe that not only are consequences (prizes, rewards) governed by external factors, but also friendship.

Friendship, then, is perceived to be a process: "Nobody wants to play with me and there is nothing I can do to improve the friendliness of others. Friendship is due to luck or chance". This will further reinforce feelings of being unable to control or direct social relationships.

For A-D/HD children with aggressive tendencies the aggression may be an expression of frustration over a world in which there is apparently no personal control. Aggression may also be a clumsy effort to regain control, by physically exerting control over people and objects in close proximity to them.

The continuation of aggressive behaviour will of course attract the teacher's attention; the teacher intervenes; the child is reinforced in their belief of external control.

## **6.4 Conclusions**

In this chapter data analyses have been presented that respond to the first Research Objective:

*To investigate the relationship between perceived Locus of Control and attentional deficiency, with greater externality hypothesized to be associated with greater deficits in attention.*

The initial analyses, which used *Pearson's Product-Moment Correlation* to examine the relationship, demonstrated that there appears to be a positive relationship between scores on the measure of perceived Locus of Control (CNS-IE) and increasing levels of A-D/HD symptomatic behaviour measured on the two parent and teacher behavioural rating



scales (CBCL, TRF - CBCL and the home and school forms of the ADDES), at least for these groups of participants. Accordingly, it can be considered that Research Objective One has been met, at least to the extent to which it is possible to be certain given the limitations of the research design and the available data .

These findings have been extended and further examined by addressing the relationships between scores on the measure of perceived Locus of Control and the four relevant *Problem Scales* of the CBCL and the TRF - CBCL (*Social Problems, Attention Problems, Delinquency and Aggressive Behavior*), as well as the three scales of the home and school forms of the ADDES (*Inattention, Hyperactivity and Impulsivity*).

The technique used for these analyses was *Multiple Linear Regression* and the most salient finding of the analyses is that it appears that the score on the CBCL *Attention Problems* scale is the best predictor of scores on the CNS-IE, at least for the present research participants. The measures of attention problems on the other three instruments also proved significant, but to a lesser extent when the CBCL *Attention Problems* score (representing parent ratings of behaviour) was present. In retrospect this result does not add very much to the results of the individual correlation between the CBCL *Attention Problems* scale and the CNS-IE, but the Researcher believes that it was important to establish this and to examine the possibility that the consideration of multiple measures of behaviour might have improved the prediction of CNS-IE scores, and, by extension, externality of perceived Locus of Control, made the exercise worthwhile.

# Chapter 7

## **Differentiation of Perceived Locus Of Control Between Boys with Attention-Deficit/ Hyperactivity Disorder and Their Peers**

This chapter examines the results of analyses conducted to establish the response to Research Objective Two:

*To explore whether perceived Locus of Control differentiates between boys diagnosed with clinical levels of A-D/HD and the clinical comparison group with normal attentional capacities.*

The three sections of this chapter present the results of the analyses, a discussion of those results, and finally, the implications of the results for practitioners in this area.

The correlations and regressions reported in the previous chapter are interesting and provide support for theoretical models of the psychological processes that are a part of A-D/HD, but it is necessary to go beyond a predictive relationship in order to establish the need for effective interventions to reduce the level of externality of perceived

Locus of Control. This can be achieved by examining the CNS-IE scores of the groups of participants.

The focus of the second Research Objective is establishing whether significant differences exist in the level of externality of perceived Locus of Control in A-D/HD boys compared to their non-A-D/HD peers. The research literature on perceived Locus of Control strongly supports the contention that the perception of an internal, or relatively internal, Locus of Control is a positive characteristic for individuals in their daily lives, particularly in occupational and in educational settings. In the latter environment the development of a personal perception of control over outcomes and events has been shown to lead to marked improvements in behavioural and academic outcomes for students (Autry & Langenbach, 1985; Bandura, 1986; 1995; 1997; Bandura & Walters, 1963; Battle & Rotter, 1963; Gomez, 1997; Graham, 1997; Trice & Gilbert, 1990; Workman, 1982). Such outcomes are highly desirable for students diagnosed with A-D/HD.

The recent change in teaching paradigm towards a more student centred approach to learning (Fitzgerald & Hattie, 1983; Fraser, 1991; Whitaker, 1995) emphasises the need for increased self-regulation, self-direction, and self-management in students. The research in this area indicates that the development of these characteristics tends to lead to positive changes in the student and their perception of learning. Among other aspects, this new paradigm focusses on self-concept as a key determinant in learning, the use of the student's inner experiences as context for learning, and students and teachers seeing each other as people rather than as rôles (Whitaker, 1995, p. 9). An emphasis on strategies leading to the development of self-management skills is clearly as desirable for students diagnosed with A-D/HD as it is for their peers who have greater attentional resources and who are less prone to reacting impulsively to events.

Students' perceptions of themselves and the way in which they form a part of the process of learning and how they function in the wider environment, implicitly requires them to believe in their ability to control outcomes and direct their learning, in other words, to have an internal perceived Locus of Control. Those students with demonstrated external perceived Locus of Control in educational settings are therefore disadvantaged in their educational development compared to their peers who have more internal perceived Locus of Control.

The trend towards student self-direction in learning is evident in recent policy documents of the Education Department of Western Australia: *Making the Difference: Students At Educational Risk* (SAER) (EDWA, 1997) and *Behaviour Management in Schools* (BMIS) (EDWA, 1998). These policies relate to the management of behaviour and scholastic outcomes for students who are at risk of failure due to social, health, behavioural, psychological, and other factors. Students who have A-D/HD are explicitly identified within these policies as requiring interventions, such as *Stop, Think, Do*, that promote self-direction in learning.

The rôle of perceived Locus of Control is intrinsic to aspects of the policy relating to the retention and participation of alienated students and the underlying causes of alienation. The recognition of the importance of self-management and the acceptance of responsibility for behaviour and its consequences are clearly stated in these policy documents, whereby students will recognise acceptable behaviour and accept the consequences of their actions (EDWA, 1998).

In order to decide whether children diagnosed with A-D/HD are characterised by external perceived Locus of Control, it is important to establish that there are significant differences between the level of externality of perceived Locus of Control of boys diagnosed with A-D/HD and their non-A-D/HD peers. The preceding research outcomes (chapter

6) confirmed the correlational relationship between the attentional status and perceived Locus of Control of the participants in the research, demonstrating that increasing severity of A-D/HD symptomatic behaviours were associated with increasing externality of perceived Locus of Control. This finding does not, however, demonstrate conclusively that boys who have A-D/HD are externalizing to a significantly different degree from boys with other types of behavioural problems. The purpose of this chapter is, therefore, to establish the presence, or otherwise, of such differences.

A further aspect that will be considered is whether members of the three diagnostic subtypes of A-D/HD (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type*, or *Combined Type*) differ significantly from each other, as well as from the non-A-D/HD participants in their level of externality of perceived Locus of Control. Differences between the subtypes may be indicative of more fundamental differences in internal regulatory processes.

## **7.1 Research Objective Two:**

### **Differences in The Locus of Control Between The Two Groups of Participants**

This Research Objective was addressed by examining the means of scores on the measure of perceived Locus of Control (CNS-IE) for the two groups of participants. The means were compared for the A-D/HD participants ( $n = 77$ ) and the non-A-D/HD, participants ( $n = 23$ ) prior to the implementation of the *Stop, Think, Do* cognitive-behavioural

intervention, as detailed in chapter five.

Table 7.1 presents the means and standard deviations of the CNS-IE scores for these two groups. Prior to testing the significance of the difference between the means, the homogeneity of variance was tested using *Levene's Test for the Equality of Variances*. This test returned the statistic:  $F = 1.670$ ,  $p = .199$ , demonstrating that no significant differences in variances exist between the two groups (Coakes & Steed, 1997; Norusis, 1994).

Group	n	Mean	Standard Deviation
A-D/HD Group	77	28.51	4.55
Clinical Comparison Group	23	16.65	3.51

Table 7.1 Means and standard deviations of participant groups' CNS-IE scores pre-intervention.

The information presented in Table 7.2 demonstrates that there are significant differences between the pre-intervention CNS-IE scores of the A-D/HD and non-A-D/HD participants, both measured prior to their participation in the *Stop, Think, Do* cognitive-behavioural intervention.

Variances	f-value	df	2-Tail Probability	SE of Difference	95% CI for Difference
<i>Equal</i>	13.21***	46, 24	.000	.897	(10.049, 13.660)

\*\*\*  $p < .001$

Table 7.2 Results of *t*-test between means of the A-D/HD and clinical

comparison groups' CNS-IE scores before the *Stop, Think, Do* intervention.

The CNS-IE scores of the A-D/HD participants were significantly higher than those of the clinical comparison group, indicating that the A-D/HD participants are more external in their perceived Locus of Control than are their peers in the clinical comparison group of participants.

A further aspect of this Research Objective is whether or not there are significant differences in the externality of perceived Locus of Control due to the subtype of A-D/HD: *Predominantly Hyperactive Type*, *Predominantly Inattentive Type*, or *Combined Type*, in each instance.

There is some evidence in the literature, as discussed in chapters two and five, that this may be the case given that differences exist in other aspects of psychological functioning associated with the differences in diagnostic status (Bohline, 1997; Du Paul et al., 1998; Gaub & Carlson, 1997; Gingerich et al., 1998; Hallahan & Cottone, 1997; Lahey et al., 1998). The allocation of participants into the three subtypes was based upon their scores on the *Inattention* and *Hyperactivity* scales of the ADDES, as detailed in the manuals for the scales (McCarney, 1989; 1989a).

Specifically, the assignment to each subtype was made on the basis of either the *Inattention Scale* or the *Hyperactivity Scale* Standard Score being two points or more below the other (e.g., for *Hyperactive Subtype* the score on the *Hyperactivity* scale must have been two or more lower than that on the *Inattention* scale), remembering that the Standard Scores on both the *Hyperactivity Scale* and the *Inattention Scale* for the A-D/HD group participants tended to be within the clinical range (Standard Scores 0 - 5) on this instrument. If this condition was not met,

then the individual was assigned to the *Combined Type* subtype, indicating that behaviours indicative of both hyperactivity and inattention were present and that neither predominated (McCarney, 1989, pp 28 - 32).

The allocation of participants to subtypes is presented in table 7.3. It is interesting to note that there is a greater representation of boys with the *Predominantly Hyperactive Type* in the A-D/HD participant group as compared to the *Predominantly Inattentive Type* and *Combined Type* diagnostic subtypes. Given both criteria for assigning boys to each group and the literature on this subject (Carlson, Shin & Booth, 1999; Gaub & Carlson, 1997; Marks, Himelstein, Newcorn & Halperin, 1999; Millstein, Wilens, Biederman & Spencer, 1997; Zarin, Suarez, Pincus, Kupersanin & Zito, 1997), it would have been expected that there would have been many more participants falling into the *Combined Type* diagnostic subtype category than actually occurred in this instance.

A-D/HD Subtype	n	Means & SD CNS-IE Score
Predominantly Inattentive Type	10	30.90 (3.03)
Predominantly Hyperactive Type	61	27.84 (4.53)
Combined Type	6	31.33 (5.01)

Table 7.3 Number of A-D/HD participants by diagnostic subtype, with means and standard deviations of CNS-IE Scores.

The high rate of *Predominantly Hyperactive Type* participants in this clinical sample may be due to the greater visibility of behaviours



characteristic of hyperactivity / impulsivity than those characteristic of inattentiveness. It is important to note that the recent National Health and Medical Research Council report found that "(i)t is also unclear whether the predominantly hyperactive-impulsive type is separate from the combined type or simply an earlier developmental stage" (NHMRC, 1997, p. 10). Given this, the possibility of there being some ambiguity between the ratings used to discriminate between the *Predominantly Hyperactive Type* and the *Combined Type* participants cannot be discounted.

The possibility must also be considered that since those boys placed at Chidley Educational Centre were referred on the basis of their acting out behaviours, they are more likely to have persistent problems with behaviours symptomatic of hyperactivity and impulsivity than those symptomatic of attentional problems. This referral bias would result in a higher proportion of *Predominantly Hyperactive Subtype* participants in comparison to that usually observed in the wider population.

In order to investigate the proposition that the level of externality of perceived Locus of Control varies between the participants in the three diagnostic subtypes a one-way ANOVA was conducted. The results found significant differences amongst CNS-IE scores among those participants falling into each of the three subtypes of A-D/HD. The number of participants in each of the diagnostic categories for A-D/HD is listed in table 7.3, along with the means and standard deviations of their CNS-IE scores, while the results of the one-way ANOVA on subtype of A-D/HD and CNS-IE scores are shown in table 7.4. The results of the one - way ANOVA indicate that significant differences exist in the degree of externalization of perceived Locus of Control, as measured by the CNS-IE, among participants identified with the three subtypes of A-D/HD.

Source	SS	df	MS	F	Significance of F
<i>Main Effects (A-D/HD Subtype)</i>	132.653	2	66.326	3.407*	.038
<i>Residual</i>	1440.594	74	19.46		

\*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

Table 7.4 Results of one-way ANOVA between diagnostic subtypes of A-D/HD groups' CNS-IE scores pre-intervention.

The one-way ANOVA demonstrates that significant differences exist between the CNS-IE scores of the participants in the three diagnostic subgroups of A-D/HD. Post-hoc analyses among the subtypes indicate that

The scores of each diagnostic subgroup were also compared to those of the clinical comparison group participants by using a series of *t*-tests. The results of these are presented in table 7.5.

Variances	t-value	df	2-Tail Probability	SE of Difference	95% CI for Difference
<b>Predominantly Inattentive Type and Clinical Comparison Group</b>					
<i>Equal</i>	11.13	31	.000***	1.280	(11.637, 16.856)
<b>Predominantly Hyperactive Type and Clinical Comparison Group</b>					
<i>Equal</i>	10.67	82	.000***	1.048	(9.100, 13.268)
<b>Combined Type and Clinical Comparison Group</b>					
<i>Equal</i>	8.36	27	.000***	1.757	(11.076, 18.286)

\*\*\*  $p < .001$

Table 7.5 Results of *t*-tests between the CNS-IE scores of each of the three diagnostic subtypes of A-D/HD and the clinical comparison group before the *Stop, Think, Do* intervention.

The results presented in table 7.5 show that the CNS-IE scores of the participants drawn from each of the A-D/HD diagnostic subtype groups are significantly different from the CNS-IE scores of the non-A-D/HD participants. The CNS-IE scores of the A-D/HD groups are higher than those of the clinical comparison group in each instance, demonstrating that, for those who participated in this research, boys diagnosed with any of the three subtypes of A-D/HD have a more external perceived Locus of Control than do their non-A-D/HD peers.

A major implication that these results seem to suggest is that participants from each of the subtypes may benefit similarly from interventions that address self-regulation and perceptions of perceived Locus of Control. The underlying problems relating to executive function which are common to each of the three subtypes appear, at least in the results of this research, to be associated with the failure to develop an internal perceived Locus of Control. This is an area which needs to be the subject of research which deals with A-D/HD diagnostic subtypes in a planned manner so that it can be investigated in a more authoritative manner.

These findings of differentiation between the behaviourally disordered boys, both those with A-D/HD and those without, are consistent with the earlier research by Linn and Hodge (1982) and that of Lufi and Parish-Plass (1995), whose studies both found that there were significant differences in CNS-IE scores between children with A-D/HD and their non-A-D/HD peers. The present study extends our knowledge by demonstrating that behavioural disorder alone is insufficient as an explanation for externality of Locus of Control, as attentional deficits appear to be a major variable in determining the externality of perceived Locus of Control.

These earlier pieces of research did not, however, examine the possibility of differences in the externality of perceived Locus of Control between the

diagnostic subgroups. Not only is the perceived Locus of Control of each of the subgroups significantly more external than that of the clinical comparison group, but the differences between each A-D/HD diagnostic subgroup in the present research are quite clear and significant.

## **7.2 Implications for Educational and Clinical Practice**

The results of this second study appear to support the contention that there are significant differences in perceived Locus of Control between boys who have A-D/HD and those who have other types of behavioural disorders.

These findings hold true when the A-D/HD participants are separated into three groups on the basis of the A-D/HD diagnostic subtypes (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type*, and *Combined Type*).

The research literature on perceived Locus of Control shows that externality of perceived Locus of Control has a negative/detrimental effect on children's behaviour. Externality affects not only their behaviour towards their peers, teachers, parents, and other adults, but also has a disadvantageous impact on behaviours relating to their school work, test performance, and study habits (LaMontagne & Hepworth, 1991; Lefcourt, 1982; Nowicki & Strickland, 1973).

As the A-D/HD boys have been shown to have a significantly more external perceived Locus of Control than do their non-A-D/HD peers, an intervention which acts to reduce the level of externality of perceived Locus of Control would be very appropriate for A-D/HD children as a first

step towards improving behavioural outcomes. Moreover, it may be more productive to focus on improving internality than targeting the symptomatic behaviours of A-D/HD more directly. An intervention program that aims merely to reduce hyperactivity (“sit still!”), impulsivity (“stop!”), or inattentiveness (“pay attention!”) is inherently negative in tone and fails to provide more effective and generalizable skills. The use of a program that develops more internal self-control through reinforcing positive interactions, and developing effective interpersonal skills through praise and enhanced self-image will be more likely to be successful in improving behaviour (Lefcourt, 1982).

The *Stop, Think, Do* program clearly meets these requirements as it is intended to develop an awareness of the consequences of behavioural choices and the self-regulation of emotional states, both of which are essential to developing a more internal perceived Locus of Control. The language used in the program (*weak, cool, aggro*) is intended to appeal to and be understood by, children and young adolescents. The reinforcers, which are intended to be delivered both by the facilitator and the other group members are constructed using this language.

*Stop, Think, Do* also has particular strengths in addressing the underlying psychological phenomena of the *Behavioural Disinhibition model* of A-D/HD, as has been discussed in chapter four of this thesis, making it a reasonable choice of cognitive-behavioural intervention for children with A-D/HD in mainstream Australian contexts. Its focus and language may limit the application of the program in other countries or even within particular social groups in Australia.

More generally, the response to the second Research Objective implies that cognitive-behavioural interventions to change children’s behaviour that begin with an assessment of the individual behavioural characteristics of the participants may achieve more effective outcomes. The practitioner must also be familiar with the specific characteristics

and behaviours which a range of interventions address.

Only when information regarding the characteristics of the participants, the proposed intervention, and the desired outcomes have been considered as fully as possible should a choice of intervention be made. The information could be obtained by using the instruments which have been used in the present research, as well as those which address other behavioural and/or personality variables, and information relating to the objectives of the interventions under consideration. The additional time and resources which this would require are compensated by the increased likelihood of positive outcomes from the chosen intervention.

## **Chapter 8**

### **Effect of Participation in a Cognitive-Behavioural Intervention on Locus of Control.**

This chapter presents the results that respond to the third Research Objective stated in chapter one:

*To determine whether a Cognitive – Behavioural Intervention significantly reduces the externality of perceived Locus of Control in boys with A-D/HD.*

The results are followed by a discussion of their implications and the chapter concludes with a consideration of the potential for further research on this topic.

The second Research Objective asked whether boys with attentional problems, such as those diagnosed with A-D/HD, are more likely to present with greater externalization of perceived Locus of Control than are their peers with greater attending capacity. The answer to the question, based on the evidence of this research, tends to suggest that this is the case. Those participants diagnosed with A-D/HD were assessed to have significantly higher levels of externality of perceived Locus of Control than do their peers forming the clinical comparison group who



have greater attentional resources and who do not, therefore, meet the diagnostic criteria for A-D/HD.

Given that this is the case, and taking into account the evidence of the positive correlates of internal perceived Locus of Control, there is a clear need to address this aspect of the psychological functioning of children with attentional deficits, in order to enable them to participate more fully in education and to attain a level of academic and social success commensurate with their other personal abilities and ambitions.

A reduction in the level of externality of perceived Locus of Control may begin to address the deficits in executive function which underpin the *Behavioural Disinhibition model* of A-D/HD (Barkley, 1995; 1996; 1998; Edwards & Barkley, 1997). The possibility of change to perceived Locus of Control and associated behaviour by using a cognitive-behavioural intervention which targets control and self-responsibility is illustrated in table 4.1, where the correspondence between aspects of the executive function deficits identified by the *Behavioural Disinhibition model* of A-D/HD and the components of the *Stop, Think, Do* program is demonstrated.

The success of appropriate cognitive-behavioural interventions in managing aspects of the behaviour of children diagnosed with A-D/HD has been shown numerous times in the literature (Abikoff, 1987; Barkley, 1990; 1995; Braswell & Bloomquist, 1991; Brown, Wynne & Medenis, 1985; Carlson et al., 1992; Green & Chee, 1994; Jarman, 1992; Jordan, 1992; Werry & Wollersheim, 1990; Whalen & Henker, 1991; Whalen, Henker & Hinshaw, 1985). The evidence for the effectiveness of cognitive - behavioural interventions, particularly when coupled with stimulant medication, has led the NHMRC to recommend such a multi-modal treatment strategy as the most effective strategy in the majority of cases (NHMRC, 1997).

The impact of a cognitive - behavioural intervention (*Stop, Think, Do*) on the perceived Locus of Control of boys with A-D/HD is discussed in this chapter. Comparisons will be made between the group of A-D/HD participants and the clinical comparison group of participants, as well as among the three diagnostic subtypes of A-D/HD (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Combined Type*) within the A-D/HD participant group.

### **8.1 Research Objective Three: Outcomes of the Intervention.**

The third Research Objective was addressed by examining the means and standard deviations for the CNS-IE scores prior to and after the *Stop, Think, Do* intervention of both the A-D/HD and clinical comparison group participants. These statistics are given in table 8.1, whilst figure 8.1 presents the pre-intervention and post-intervention means graphically, demonstrating the extent of change for the two groups of participants due to the *Stop, Think, Do* intervention program. The means and standard deviations for the A-D/HD group, broken down into the three subtypes of A-D/HD (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Combined Type*), and for the clinical comparison group are then presented in table 8.2 and graphically in figure 8.2.

A within-groups repeated measures ANOVA, was conducted to test the significance of changes in perceived Locus of Control pre- and post-intervention (Coakes & Steed, 1997, pp 120 - 123; Keppell, 1982; Norusis, 1994, pp. 195 - 202).

	A-D/HD <i>n</i> = 77	Clinical Comparison Group <i>n</i> = 23
Pre-intervention Mean (Standard Deviation)	28.51 (4.55)	16.65 (3.51)
Post-intervention Mean (Standard Deviation)	23.95 (4.15)	14.56 (3.12)

Table 8.1 Means and standard deviations of CNS-IE pre- intervention and post- intervention scores for A-D/HD and clinical comparison groups.

	Inattentive <i>n</i> = 10	Hyperactive <i>n</i> = 61	Combined <i>n</i> = 6	Clinical Comparison Group <i>n</i> = 23
Pre-intervention Mean (Standard Deviation)	30.90 (3.04)	27.83 (4.53)	31.33 (5.01)	16.65 (3.51)
Post-intervention Mean (Standard Deviation)	24.20 (4.26)	23.61 (4.06)	27.00 (4.24)	14.56 (3.12)

Table 8.2 Means and standard deviations of CNS-IE scores pre-intervention and post-intervention, with the A-D/HD participants separated into diagnostic subtypes.

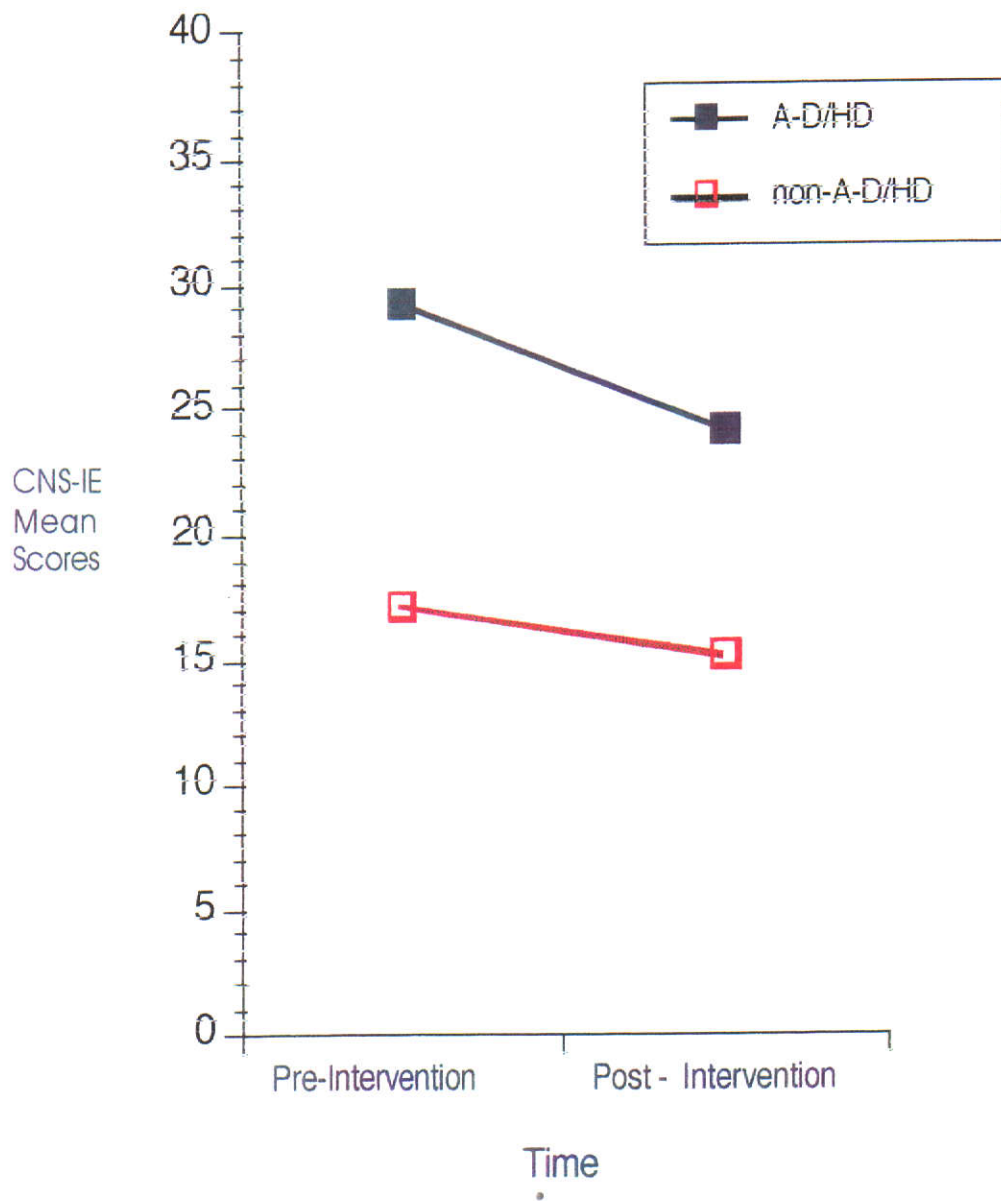


Figure 8.1 Pre-intervention and post-intervention means of CNS-IE scores of the A-D/HD and clinical comparison groups of participants.

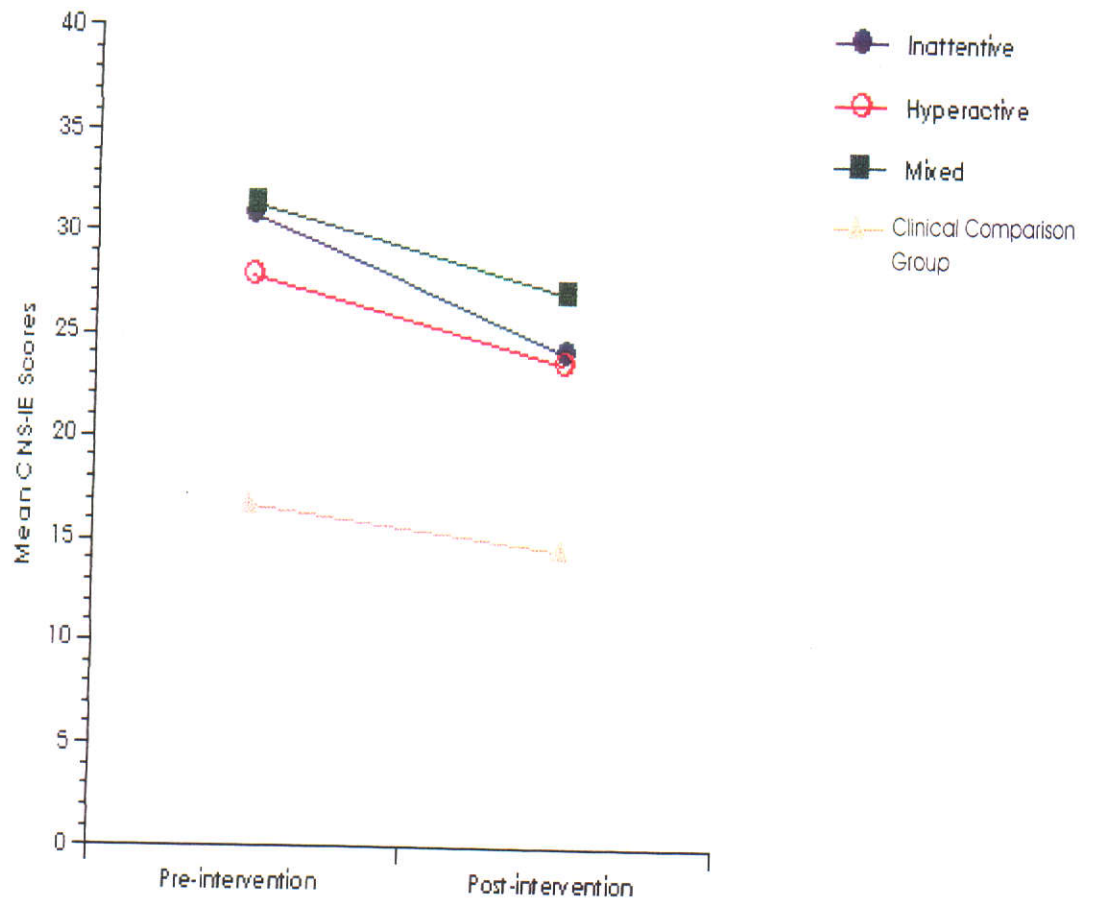


Figure 8.2 Group means of CNS-IE scores pre- intervention and post-intervention, A-D-HD participants, grouped by diagnostic subtypes, and clinical comparison group.

The results of these analyses are shown separately in tables 8.3 and 8.4 for the A-D/HD and non-A-D/HD participants, respectively, and for all participants (grouped as A-D/HD and clinical comparison group) in table 8.5. Finally the analysis is conducted between the clinical comparison group and the A-D/HD participants with the latter separated into the three diagnostic subtypes. The results of this analysis are contained in table 8.6.

Source	SS	df	MS	F	Significance of F ( <i>p</i> )
<i>Within + Residual</i>	720.49	76	9.48		
<i>CNS-IE</i>	800.01	1	800.01	84.39	.000***

\* *p* < .05 \*\* *p* < .01 \*\*\* *p* < .001

Table 8.3 Results of within-subjects repeated measures ANOVA for the A-D/HD participants' CNS-IE scores.

Source	SS	df	MS	F	Significance of F ( <i>p</i> )
<i>Within + Residual</i>	32.91	22	1.50		
<i>CNS-IE</i>	50.09	1	50.09	33.48	.000***

\* *p* < .05 \*\* *p* < .01 \*\*\* *p* < .001

Table 8.4 The results of within-subjects repeated measures ANOVA for the clinical comparison group participants' CNS-IE Scores.

**Effect of Participation**

Source	SS	df	MS	F	Significance of F (p)
<i>Within + Residual</i>	753.41	98	7.69		
<i>Time</i>	391.05	1	391.05	50.87	.000***
<i>Status by Time</i>	54.09	1	54.09	7.04	.009**

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Table 8.5 Results of within-subjects repeated measures ANOVA for A-D/HD participants and clinical comparison group participants' CNS-IE scores.**

Source	SS	df	MS	F	Significance of F (p)
<i>Within + Residual</i>	746.49	96	7.78		
<i>Time</i>	329.73	1	329.73	42.40	.000***
<i>Status by Time</i>	61.01	3	20.34	2.62	.2065

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Table 8.6 Results of within-subjects repeated measures ANOVA for A-D/HD participants' CNS-IE scores and clinical comparison group CNS-IE scores, with the A-D/HD participants grouped by diagnostic subtypes.**

The results of the within-subjects repeated measures ANOVA for the A-D/HD participants (table 8.3) indicate that the difference between the

pre-intervention and the post-intervention scores is statistically significant, indicating that there has generally been a change in the CNS-IE scores of the participants and that this change was observed to be in the direction of lower externality.

For the clinical comparison group the ANOVA results, shown in table 8.4, again indicate that the difference between the pre-intervention and the post-intervention scores is also significant, indicating the probability that the *Stop, Think, Do* intervention had the effect of reducing the externality of perceived Locus of Control for these participants, as it did with the A-D/HD participants.

When the two groups of participants are compared using a two-way repeated measures ANOVA the results (contained in table 8.5) indicate that there has been a significant change in the participants mean CNS-IE scores between the two administrations of the instrument. The interaction effect (Status  $\times$  Time) is also statistically significant indicating that there are differences between the two groups regarding the extent to which the means have changed. Inspection of the graph (figure 8.1) indicates that the reduction in externality of perceived Locus of Control from preintervention to postintervention is relatively greater for the A-D/HD participants group than for the clinical comparison group participants.

As the results so far considered demonstrate that the perceived Locus of Control of the participants was significantly changed in the direction of decreased externality for the entire group, it was decided to separate the results for the A-D/HD participants into the diagnostic subgroups and examine the possibility of differences in the effectiveness for the *Stop, Think, Do* intervention program between the three diagnostic subgroups.

As this is a *post hoc* examination using the existing participants, the Researcher realises that the sample sizes are very uneven and that the



results drawn from them must be interpreted cautiously.

When the results for the three diagnostic subtypes of A-D/HD (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type* and *Combined Type*) and the clinical comparison group, as shown in table 8.6, are examined, it can be seen that there was a statistically significant reduction in the level of externality of perceived Locus of Control for all the participants over time. However, the interaction effect (Time x Status) is not statistically significant, indicating that in this instance the differences between each of the subtype groups and the clinical control group were not significant, and the relative differences were preserved over time.

The source of the interaction (*Status x Time*) observed in table 8.6 is clarified by examining table 8.7. The results of the three within-subjects repeated measures ANOVAs indicate that although there are significant differences between the pre- and post-intervention CNS-IE means of each A-D/HD diagnostic subtype group and that of the clinical comparison group, only in the case of the *Predominantly Hyperactive Type* subtype group is there a significant interaction effect.

The differences in the number of participants in each diagnostic subtype would influence this result and replication of this using larger, more equal groups of participants would be necessary in order to be confident of the applicability of the results to the general population of children diagnosed with the specific diagnostic subtypes of A-D/HD.

Source	SS	df	MS	F	Significance of F (p)
<b>Predominantly Inattentive Type &amp; Clinical Comparison Group:</b>					
<i>Within + Residual</i>	99.16	31	3.20		
<i>Time</i>	108.78	1	108.78	34.01	.000***
<i>Status by Time</i>	6.96	1	6.96	2.18	.150
<b>Predominantly Hyperactive Type &amp; Clinical Comparison Group:</b>					
<i>Within + Residual</i>	568.56	81	7.02		
<i>Time</i>	378.78	1	378.78	53.96	.000***
<i>Status by Time</i>	57.34	1	57.34	8.17	.005**
<b>Combined Type &amp; Clinical Comparison Group:</b>					
<i>Within + Residual</i>	144.58	27	5.35		
<i>Time</i>	98.08	1	98.08	18.32	.000***
<i>Status by Time</i>	12.01	1	12.01	2.24	.146

\*  $p < .05$  \*\*  $p < .001$  \*\*\*  $p < .001$

Table 8.7 Results of individual within-subjects repeated measures ANOVAS for A-D/HD participants' CNS-IE scores and clinical comparison group CNS-IE scores.

A number of points need to be considered in relation to this Research Outcome.

Is the observed decline in CNS-IE score due to time alone? The answer to this is that this may possibly be so. Bearing in mind that the test/retest reliability of the CNS-IE has been found to be quite high, around .70, for intervals of some six weeks, then the scores can be seen as quite stable for the shorter period of time (four weeks) involved in the present research (Kline, 1993; LaMontagne & Hepworth, 1991; Nowicki & Strickland, 1973). Given this, there is a likelihood that the change was due to the effects of the *Stop, Think, Do* program, rather than change over time due to maturation. This likelihood is sufficient to warrant further research.

These results tentatively support the hypothesis that perceived Locus of Control is more external for boys diagnosed with A-D/HD.

To extend the research from its current clinical perspective an appropriate research design would be a 2 x 2 design involving A-D/HD participants and non-A-D/HD participants, as well as control groups of non participating A-D/HD and non-A-D/HD individuals. This would allow the research to control for the effects of time , as well as A-D/HD status.

It is interesting to speculate whether the subtypes of A-D/HD reflect somewhat different deficits in each of the four executive functions posited in the *Behavioural Disinhibition model* of A-D/HD:

- *Nonverbal Working Memory* –the ability to retain a mental representation of an event and manipulate it mentally, using hindsight or forethought from previous experience, as well as anticipation and a sense of sequence and of time.
- *Self-Regulation of Affect, Motivation and level of Arousal* –

emotional self-control, objectivity and social judgement are all impaired, making it difficult for them to be used effectively in the self-regulation of drives and motivational factors, the regulation of arousal and the use of arousal in a goal-directed fashion.

- *Internalisation of Self-directed Speech* – the ability to describe actions, outcomes, and reflection on these, rule-governed behaviours. This affects problem solving, questioning and moral reasoning.
- *Reconstitution* – analysis and synthesis of concepts and processes, verbal fluency, goal directed creativity.

It may be, for example that for the boy who falls into the *Predominantly Inattentive Type* diagnostic subtype, there are particular deficits in *Non-Verbal Working Memory*, whilst his *Internalisation of Self-directed Speech* is less strongly affected. Contrarily the boy who falls into the *Predominantly Hyperactive Type* diagnostic subtype may have relatively poor *Self-Regulation of Affect, Motivation and level of Arousal*, while his *Non-Verbal Working Memory* may be less impaired.

This is potentially a fruitful area for further research, but care will need to be taken with regard to obtaining sufficiently large and representative samples of participants and also in the selection of instruments with appropriate sensitivities.

## 8.2 Clinical and Educational Implications

The apparent effects of *Stop, Think, Do* on the perceived Locus of Control of all the participants suggest that it may be an appropriate intervention for those situations when developing a more internal perceived Locus of Control is a desirable outcome of a cognitive-behavioural program.

That this is desirable is clearly evident from an examination of the literature relating to cognitive-behavioural interventions (Autry & Langenbach, 1985; Bandura, 1995; Braswell & Bloomquist, 1991; Hallahan & Cottone, 1997; Herbert, 1991; Lefcourt, 1982). The attributional aspects of participant's beliefs are pivotal in developing an understanding of how they can effectively manage their own behaviour and interact with their social environment. This has been seen as an important factor in developing self-management of behaviour and responsibility (Braswell & Bloomquist, 1991; Hallahan & Cottone, 1997; Lefcourt, 1982; Workman, 1982; Zentall, 1989).

The apparent effectiveness of the *Stop, Think, Do*, cognitive-behavioural intervention in reducing the level of externality of perceived Locus of Control of boys from all three subtypes of A-D/HD who participated in this research, as well as that of those who do not have A-D/HD, has been demonstrated to some extent by this study. Given that all of the boys who participated in the study were behaviourally disordered, the intervention has benefited all of them, and there is some evidence that the greatest effect was among those boys with attentional deficits.

The benefits in perceived internal control over behaviour and events in the environment may be expected to be manifest in changes to behaviour and social competence, and leads to improved behaviour and social interactions. Post intervention follow up of the improvements in behaviour and measurement of the subsequent maintenance of such gains are beyond the scope of the present research, but are considered in

the final section of this chapter.

The outcomes of the intervention suggest the value of the use of cognitive - behavioural programs such as *Stop, Think, Do* in schools. It has widely been recognised (Gresham, Mac Millan & Bacion, 1996; M<sup>c</sup>Donnell, Thorson & M<sup>c</sup>Quivey, 1997; Wigle & Wilcox, 1996) that the amount of time spent on-task, or *Academic Engaged Time*, is a major factor in successfully reaching academic goals. Programs which remove children from their classroom but are ineffective in meeting their stated goals would be a distinct waste of material and time resources for the school, the parents, and the child. It would also be ethically dubious to take up time (two 40 - minute periods per week in this instance) that could otherwise be productively spent as *Academic Engaged Time*, an issue which was raised in chapter four of this thesis. However, given gains in internal perceived Locus of Control, the gains made and the potential longer term benefits to learning strategies may justify the resources devoted to this kind of intervention.

A second implication of the effect of decreasing the externality of perceived Locus of Control is that parents and teachers may maintain and enhance internalized perceived Locus of Control through appropriate reinforcement, particularly verbal reinforcement, of responses and behaviour which reflect awareness of self-control and self-management by the child. Failure to do this will inevitably undermine the effectiveness of the initial intervention.

The potential for undermining of the perception of control can be seen in the ways in which parents frequently articulate, express and verbalize explicitly their frustration to the child regarding their behaviour and taking responsibility for it. When this occurs it contributes to the child's perception of a lack of control over their behaviour and of the causal connection between their behaviour and its consequences.

In the classroom teachers may similarly undermine the development of internality through their control of reinforcers in that setting. This can be countered by the use of behaviour management structures which emphasize choice and responsibility, such as *Assertive Discipline* (Canter & Canter, 1992), as well as cognitive - behavioural interventions. Consistent emphasis on the choice and responsibility aspects should buttress the development of a perception of internalized Locus of Control, rather than reinforce the perception of external control.

Behaviour management strategies directed towards improving self-management have been widely used for several years in Western Australia and elsewhere. They are also highly consistent with student-centred learning, which is presently being adopted as a major educational paradigm by the Education Department of Western Australia (EDWA, 1997; 1998).

Thirdly, the outcomes raise issues regarding effective interventions for A-D/HD. It is widely accepted that a multi-modal, two stage intervention, specifically using stimulant medication and a cognitive - behavioural intervention, is generally the most effective form of intervention for the disorder (Barkley, 1995; Garber, Garber & Spizman, 1997; Green & Chee, 1994; Hallahan & Cottone, 1997; Hinshaw, Henker & Whalen, 1984; Jarman, 1992; NHMRC, 1997; Whalen & Henker 1991).

Linn and Hodge (1982) have commented: "Unfortunately use of stimulant medication alone may do little to help them (children with A-D/HD) attain an internal locus of control" (p. 593). This belief has also underpinned the position taken by many parents (and teachers) who resist medication in the belief that it would not develop a sense of control and would provide another excuse for not accepting responsibility for the consequence of behaviour or for scholastic outcomes (Garber, Garber & Spizman, 1997).

However, this popular belief has not been supported by the limited research conducted on this topic. One of the few major studies available which investigated the effects of Ritalin on the attributions of A-D/HD boys found that rather than having an increased externality of perceived Locus of Control, boys who took stimulant medication had a quite normal perceived Locus of Control (Pelham et al., 1992). The current study has shown that boys taking stimulant medication were highly externalising in their perceived Locus of Control before the intervention and subsequently developed a more internalising Locus of Control in the relatively brief interval of four weeks. Clearly the use of a cognitive-behavioural intervention such as *Stop, Think, Do* may help to overcome the perceived deficit of the use of stimulant medication alone in treating individuals with A-D/HD.

Additionally, the internality of perceived Locus of Control could be enhanced if the taking of medication is cast in the light of enhancing choice and control, rather than serving as a further example of the way in which external agencies control the individual. The possible implications for *effective* treatment of A-D/HD are, therefore, not one psychosocial intervention, but two – stimulant medication, partnered initially by cognitive-behavioural intervention to internalize perceived Locus of Control and followed by cognitive reframing to sustain the perceptions and behaviours that are more adaptive.

The cognitive-behavioural intervention, such as *Stop, Think, Do* for example, provides behavioural strategies for the participants, whilst the proposed cognitive reframing develops thought patterns that assist in increasing internality of perceived Locus of Control. Indeed, the two cognitive aspects could be seen to develop self-actualization.



### **8.3 Directions for Future Research**

The results presented in this chapter suggest that the cognitive - behavioural intervention *Stop, Think, Do* has contributed to decreasing the level of externality of perceived Locus of Control of boys diagnosed with A-D/HD, as well as their non-A-D/HD peers.

Two aspects that it was not possible to investigate were the maintenance of the change to perceived Locus of Control over a period of time after the completion of the *Stop, Think, Do* intervention, and its impact on the severity of A-D/HD symptomatic behaviour.

The clinical settings for the current research did not lend themselves to a structured follow up of the participants. Those participants who took part in the research at the Chidley Educational Centre, returned to their original schools, which were often hundreds of kilometres away from the Researcher, as previously discussed in chapter 5. This precluded further observations of their behaviour.

A further impediment to effective post-intervention follow up was the relatively frequent relocation of many of the participants' families, usually related to changes related to employment. The parents were difficult to locate and the boys were placed in different schools with teachers who had no knowledge of them prior to their involvement in the research and who, therefore, could not really compare the boys' behaviour before and after the intervention.

The Researcher does not believe that this could be overcome for a project using a large number of participants except by having members of a research team provide behavioural ratings based on classroom observations before and after intervention. Even then it would be difficult to account for changes due to relocation such as the match between teacher and child temperament, home factors, social and environmental

changes, and the change in dynamics with a new peer group. Such a program would be beyond the means of an individual researcher and would most likely have to be carried out by an educational or health authority, or a university working in partnership with such an authority.

A further direction for research could be the qualitative analysis of the attribution statements of participants. This could take the form of analyzing the items from the CNS-IE instrument, or by using structured interviews to gather information on attributions of causality and related aspects of perceived Locus of Control.

## **8.4 Conclusions**

The investigation of Research Objective Three has indicated that the use of the cognitive-behavioural intervention *Stop, Think, Do* has probably altered the perceived Locus of Control of both A-D/HD and clinical comparison group boys in the direction of increased internality. The interaction seen between [A-D/HD]*Status* and *Time* on the ANOVA examining the changes in mean CNS-IE scores between the two groups of participants (tables 8.5 and 8.7) demonstrated a relatively greater decline in externality of perceived Locus of Control for the A-D/HD participants than for the clinical comparison group. Further analysis indicated that the observed interaction could most likely be attributed to the decline in CNS-IE scores for the largest of the diagnostic subtype subgroups (*Predominantly Hyperactive Type*). However, the limitations of the research program, particularly with regard to more even representation of diagnostic subtypes and a non-behaviourally disordered comparison group; and non participant comparison groups of both A-D/HD and non-A-D/HD individuals would enable stronger and more generalizable conclusions to be reached.

## **Chapter 9**

### **Further Investigations: *Cluster Analysis* and *Discriminant Analysis***

In chapter two of this thesis the issue of parents and teachers identifying symptomatic behavioural characteristics of A-D/HD in different settings was raised.

Under the present diagnostic scheme of the DSM-IV (APA, 1994) it is necessary for behaviours symptomatic of A-D/HD to be functionally impairing in at least two settings, particularly home and school. If the two most important raters – parents and teachers – have difficulty in forming a consistent picture of a child's behaviour then it is not surprising that there has been controversy in the literature and among practitioners regarding the diagnosis of A-D/HD, and considerable tension between parents and teachers as a result (Bailey & Curtis, 1997; Barkley, 1990; 1995; Du Paul et al., 1997; Du Paul, et al., 1998; Garber, Garber & Spizman, 1997; Jordan, 1992; Milich & Fitzgerald, 1985).

The first Research Objective of this thesis, examined in chapter six, addressed the relationships between the ratings of behaviour by parents and teachers of behaviours symptomatic of A-D/HD and boys' scores on a measure of perceived Locus of Control. It was found that many of the

ratings of behaviour were significantly correlated with externality of perceived Locus of Control. Further investigation found that a relatively small number of measures of behaviour, particularly the *Attention Problems* Problem Scale of the CBCL, completed by parents, was a strong and consistent predictor of scores on the CNS-IE (the measure of perceived Locus of Control).

The data which had been gathered to address the first Research Objective can also be used to examine the relationships between parent and teacher ratings of behaviour. The two instruments used to quantify behaviours symptomatic of A-D/HD, the CBCL and the ADDES, both use equivalent parent and teacher forms which yield directly comparable ratings between the two groups of raters.

Two statistical techniques were used to examine the data, one – *Cluster Analysis* – examining similarities between the ratings for the diagnostic sub groups of A-D/HD participants, the other, *Discriminant Analysis*, examining the group membership of individuals. The ratings for the non-A-D/HD control group boys were not used in the *Cluster Analysis* as it was intended to examine the perception of behaviours related to A-D/HD. The results of these analyses and a discussion of them comprise the next two sections of this chapter.

## **9.1      *Cluster Analysis***

*Cluster Analysis* is a statistical technique which enables the researcher to group or classify objects or cases on the basis of quantified characteristics. The goal of *Cluster Analysis* is to identify homogenous groups or clusters (Norusis, 1993, p. 83). The technique is based on the measurement of the distance between scores and their similarity.

The manuals for version 6.1 of SPSS (Norusis, 1993; 1994) present appropriate methods for selecting variables, statistics and outputs for the

### **Further Investigations: Cluster Analysis and Discriminant Analysis**

*Cluster Analysis* (specifically *Agglomerative Hierarchical Cluster Analysis*) of data such as the rating scale scores used in this research. The procedures given in the manuals were followed in each instance to generate *Cluster Analyses* of the sets of data shown in table 9.1 below.

1	Parent Ratings: CBCL and ADDES (Home)
2	Teacher Ratings: TRF-CBCL and ADDES (School)
3	Parent and Teacher Ratings: ADDES (Home) and ADDES (School)
4	Parent and Teacher Ratings: CBCL and TRF-CBCL
5	Parent and Teacher Ratings: CBCL, TRF-CBCL, ADDES (Home) and ADDES (School)

Table 9.1 Rating scales used in the *Cluster Analyses*.

As the two sets of rating scales, CBCL, TRF-CBCL and the two forms of the ADDES (Home and School), use differing formats for their scores, *T-Scores* and *Scaled Scores*, respectively, all of the scores were standardized to *Z-Scores* and transformed to *Absolute Scores*, to allow for consistent comparisons between the four instruments for these *Cluster Analyses*.

#### **Parent Ratings: CBCL and ADDES (Home)**

The first of the *Cluster Analyses* examines the relationship between scores on the two instruments completed by parents measuring

behaviours symptomatic of A-D/HD.

It should be borne in mind that the ADDES is intended for use in diagnosing A-D/HD and the items on all three subscales relate directly to behaviours symptomatic of A-D/HD.

The CBCL on the other hand is used in the assessment of a wide variety of behavioural and other mental health disorders and it contains items which examine a range of disorders other than A-D/HD, as well behaviours symptomatic of A-D/HD.

As was discussed in chapter four of this thesis there is general agreement that the CBCL is a valuable tool in diagnosing A-D/HD in children and that four of the subscales (*Attention Problems, Social Problems, Aggressive Behaviour, and Delinquency*) have been shown to predict the diagnosis of A-D/HD very effectively (Barkley, 1990; 1995).

The results of the *Cluster Analysis* for the CBCL and the home form of the ADDES are shown in the agglomeration schedule contained in Appendix D, table D 1, and graphically, by means of a *Dendrogram* in figure 9.1 below.

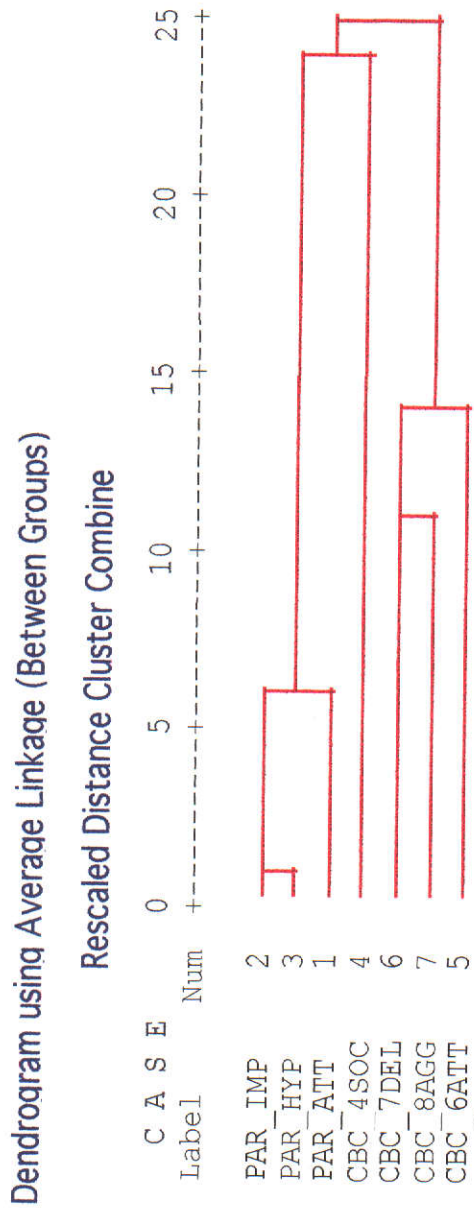


Figure 9.1 Dendrogram showing linkages between scales on the ADDES (Home) and the CBCL Problem Scales.

The *Dendrogram* shows that the first cluster, and closest linkage, is between the ratings of impulsivity and hyperactivity on the ADDES. The parent ratings of attention on the ADDES then joins the cluster at the next stage. The four CBCL *Problem Scales*, except for *Social Problems*, form clusters at relatively short distances from one another, before finally linking to the ADDES scales. The *Social Problems* scale links to the three ADDES scales at such a distance from the other scales that its relationship to the other scales is minimal, as can be seen in the *Dendrogram* for the analysis (figure 9.1).

These results indicate that the scores from the two instruments tend to cluster within themselves, rather than by the behaviours which they assess. This is particularly the case for the ADDES, probably reflecting the nature of the instrument and its focus on a constellation of A-D/HD - symptomatic behaviours, as opposed to the CBCL, which is intended to systematize ratings of observed behaviours reflecting a larger number of disorders and syndromes.

### **Teacher Ratings: TRF-CBCL and ADDES (School)**

This second *Cluster Analysis* examines the relationship between scores on the two instruments completed by teachers, the ADDES (School) and the TRF-CBCL. The results of the *Cluster Analysis* conducted on the TRF-CBCL and the school form of the ADDES are shown in the agglomeration schedule contained in Appendix D, table D 2, and graphically, by means of a *Dendrogram*, in figure 9.2 below.



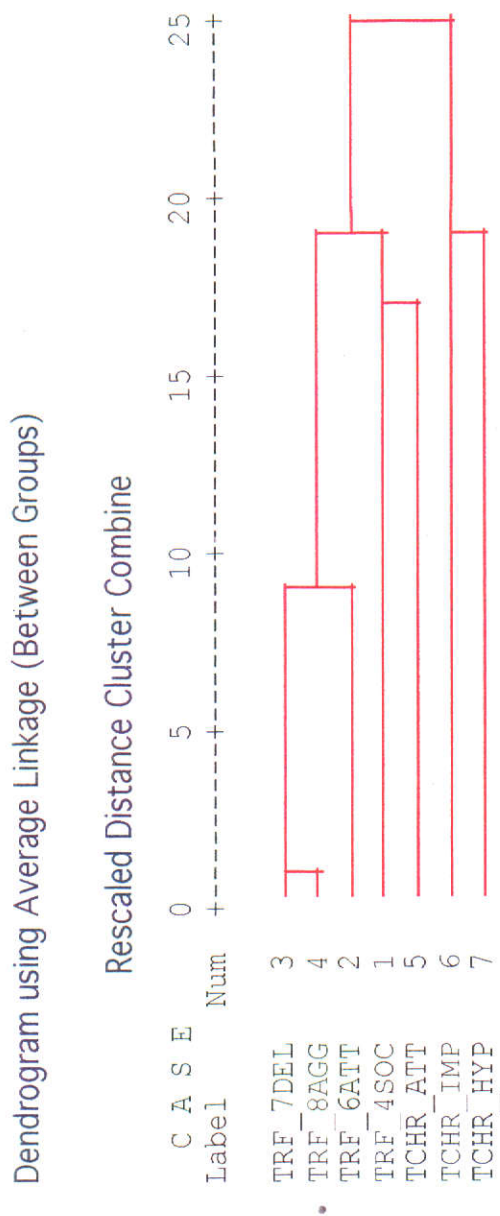


Figure 9.2 Dendrogram showing linkages between scales on the ADDES (School) and the TRF-CBCL Problem Scales.

The results of the *Cluster Analysis* for the two teacher-completed instruments are quite dissimilar to those of the equivalent parent-completed forms.

Three of the TRF-CBCL *Problem Scales* (*Delinquency*, *Aggression*, and *Attention Problems*) form the initial clusters, whilst the remaining TRF-CBCL scale, *Social Problems*, and the ADDES *Attention* scale link to one another and then to the other TRF-CBCL at a greater distance to them. The *Hyperactivity* and *Impulsivity* scales of the ADDES also form a cluster, which reflects the results of the parent forms, although the sequence is different for the teacher forms.

These findings mean that the TRF-CBCL appears to have more salience for teacher ratings, while the ADDES provides more informative clusters when parent ratings are being examined.

### **Parent and Teacher Ratings: ADDES (Home) and ADDES (School)**

The third of the *Cluster Analyses* investigates the possible linkages between scores on the ADDES forms which were completed by the parents and teachers of the boys in the A-D/HD groups.

The results of the *Cluster Analysis* for the two forms of the ADDES are shown in the agglomeration schedule in Appendix D, table D 3, and also graphically in the *Dendrogram* in figure 9.3.

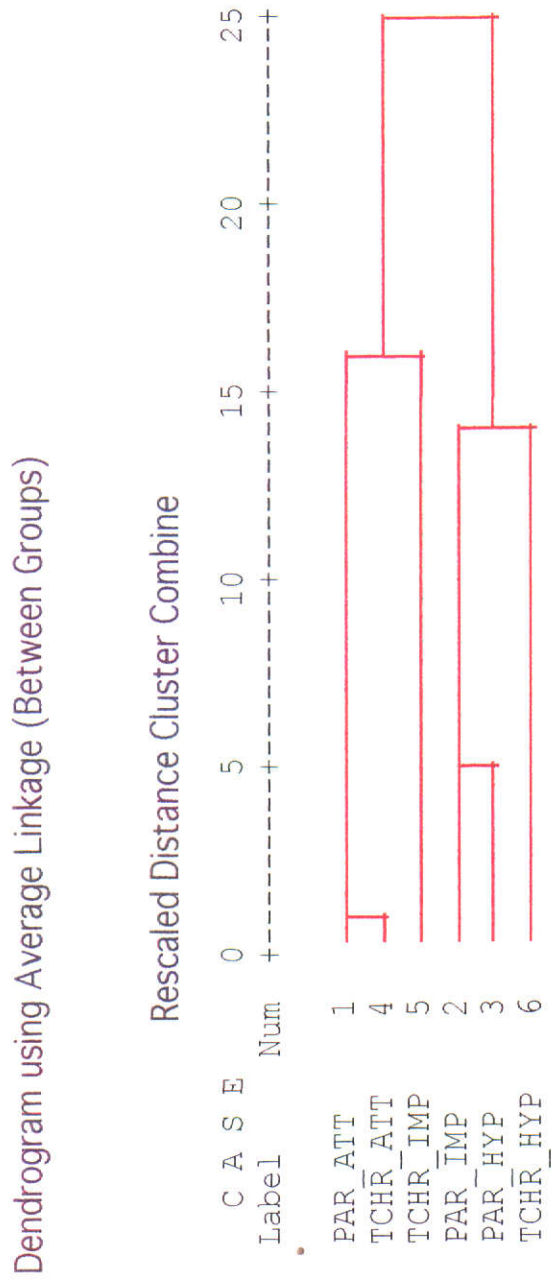


Figure 9.3 Dendrogram showing linkages between scales on the ADDES (Home) and the ADDES (School).

The *Dendrogram* shows that the first cluster, and therefore the closest linkage, is between the parent and teacher ratings of inattention on the ADDES. The two remaining parent ratings (*Hyperactivity* and *Impulsivity*) form a separate cluster at the next stage, which then clusters with the teacher rating of hyperactivity.

The *Attention* cluster is linked with teacher rating on the *Impulsivity* scale. The remaining scale, the teacher rating of hyperactivity clusters with the Parent *Impulsivity* and *Hyperactivity* ratings, before all of the subscales form one cluster.

These results imply that parents and teachers, as groups, are consistent in seeing inattention as a primary behavioural symptom of A-D/HD. This reflects similar findings from the multiple regression and correlation results discussed in chapter six.

### **Parent and Teacher Ratings: CBCL and TRF-CBCL**

The fourth *Cluster Analysis* examines the relationship between scores on four of the *Problem Scales* of the CBCL and TRF-CBCL, completed by parents and teachers respectively.

These four *Problem Scales* are those which have been consistently described in the literature as providing a measure of behaviours symptomatic of A-D/HD (Achenbach, 1991; Achenbach, 1991a; Barkley, 1995; Edelbrock et al., 1985; Pelham, 1991). The results of the *Cluster Analysis* for the CBCL and the TRF-CBCL *Problem Scales* are shown in the agglomeration schedule contained in Appendix D, table D 4, and graphically, by means of a *Dendrogram*, in figure 9.4 below.

Dendrogram using Average Linkage (Between Groups)

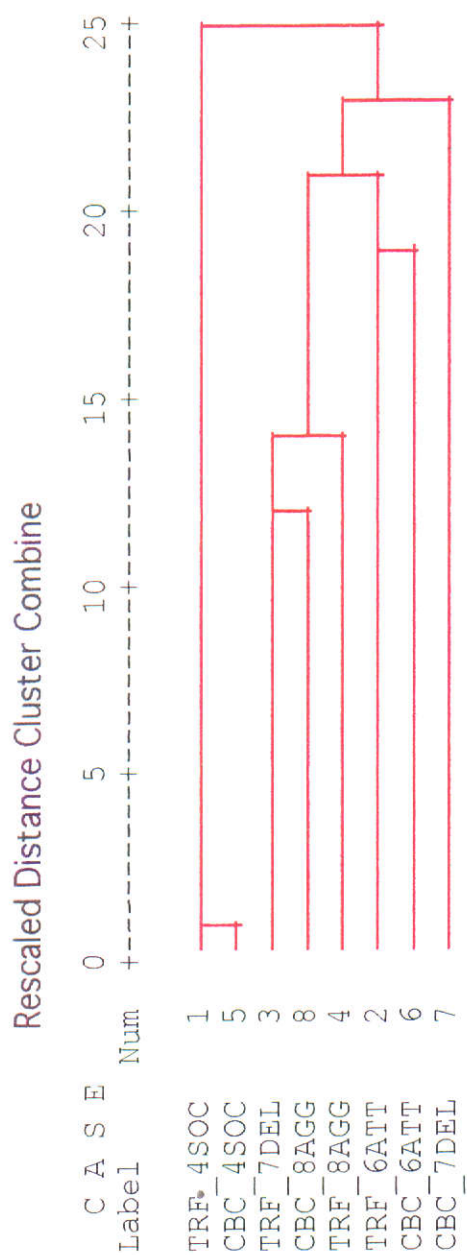


Figure 9.4 Dendrogram showing linkages between Problem Scales on the CBCL and the TRF-CBCL.

Broadly speaking, the results of the *Cluster Analysis* on the CBCL and TRF-CBCL tends to yield linkages between the equivalent scales on each instrument, or clusters with relatively short distances between their members. Particularly notable are the *Social Problems* scales, whilst the *Attention Problems* scales, which had been prominent in other analyses only form a cluster at a considerable distance from the origin.

As was the case with the analysis of the two forms of the ADDES, these results show a tendency towards consistency in the ratings on particular scales leading to the identification of particular types of A-D/HD-symptomatic behaviour between the parents and teachers of the participants.

### **Parent and Teacher Ratings: CBCL and TRF-CBCL, ADDES Home and ADDES School.**

The fifth and final *Cluster Analysis* examines the linkages between *Problem Scale* scores on the CBCL and TRF-CBCL, the ADDES (Home) and the ADDES (School) forms, comprising all four behavioural rating instruments used in this research.

The results of the *Cluster Analysis* for these four instruments are shown in the agglomeration schedule contained in Appendix D, table D 5, and graphically, by means of a *Dendrogram*, in figure 9.5 below.

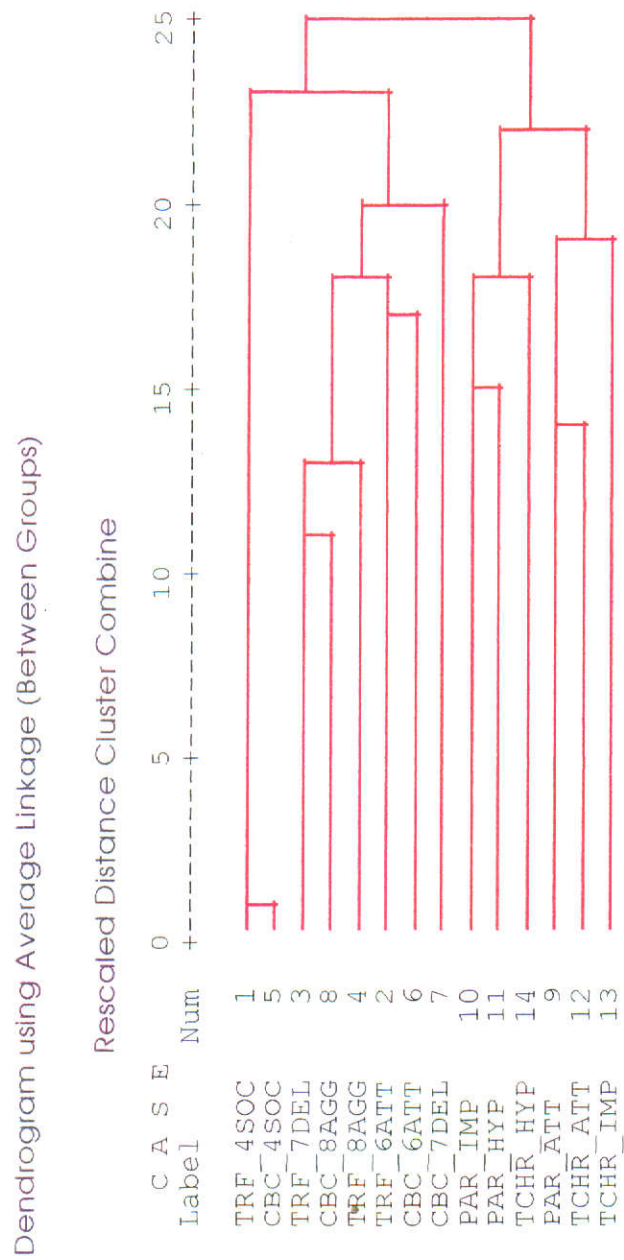


Figure 9.5 Dendrogram showing linkages between scales on the ADDES (Home), ADDES (School), the CBCL and TRF-CBCL Problem Scales .

The results of this final *Cluster Analysis* indicate that the ratings of *Social Problems* on the CBCL and TRF-CBCL form the first cluster to be developed, but it does not link to any other scales until the very end of the process. A similar pattern emerges from an examination of the remainder of the *Dendrogram*; the equivalent scales on the parent and teacher forms of the two instruments tend to cluster with each other, usually at the initial linkage for both scales.

This suggests that the greatest consistency in scores is amongst those where the same questions are being asked of children's behaviour. The conclusions that may be drawn from this are that the 77 parents and 19 teachers who provided ratings of the A-D/HD participants in this research are very consistent in their ratings of specific behaviours and this implies that the two groups of raters are observing similar behaviours and quantify them in a consistent manner. This is emphasised by the consistency of these results, as it is a feature in each *Cluster Analysis* where parent and teacher ratings are compared.

Conversely, when scores on the CBCL and ADDES (Home) or the TRF-CBCL and ADDES (School) are compared the clusters tend to form among each instrument, rather than along functional lines of measures of similar behaviours.



## 9.2 Discriminant Analysis

*Discriminant Analysis* can be used either to assign items to one of a range of groups (such as diagnostic categories) or to assess the adequacy of a classification scheme. The technique involves generating linear combinations of predictor variables which serve as the basis for assigning individual cases into one or another of the groups (Norusis, 1993).

In this section *Discriminant Analysis* is being used for the latter purpose, to assess whether the scores of participants on the behavioural rating scales accurately predict their A-D/HD diagnostic status. The use of *Discriminant Analysis* in this instance can be summarized as confirming that each participant was correctly assigned to either the A-D/HD, and the appropriate diagnostic subgroup (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type*, or *Mixed Type*) or the clinical comparison group.

The specific subscales of the ADDES and CBCL which were employed in the *Discriminant Analyses* are given in table 9.2 below.

Parent Ratings:	
CBCL	Attention Problems, Social Problems, Aggressive Behavior, Delinquency
ADDES (Home)	Inattention, Hyperactivity, Impulsivity
Teacher Ratings:	
TRF-CBCL	Attention Problems, Social Problems, Aggressive Behavior, Delinquency
ADDES (School)	Inattention, Hyperactivity, Impulsivity

Table 9.2: Behaviour rating scales used in the *Discriminant Analyses*.

## Discriminant Analysis on Parent Ratings of Behaviour

The first *Discriminant Analysis* examines the membership of the four groups (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Mixed Type* and clinical comparison group) based on the behaviour rating instruments (CBCL and ADDES(Home)) completed by the boys' parents.

The *Classification Results* of the *Discriminant Analysis* are contained in table 9.3 below.

Classification results -

Actual Group	No. of Cases	Predicted Group Membership			
		0	1	2	3
Group 0 (Inattentive)	10	3 30.0%	6 60.0%	1 10.0%	0 .0%
Group 1 (Hyperactive)	61	1 1.6%	60 98.4%	0 .0%	0 .0%
Group 2 (Mixed)	6	0 .0%	4 66.7%	2 33.3%	0 .0%
Group 3 (Non-A-D/HD)	23	0 .0%	0 .0%	0 .0%	23 100.0%

Percent of "grouped" cases correctly classified: 88.00%

Table 9.3 Results of the *Discriminant Analysis* on parent ratings of behaviour.

The results show that on the basis of the parent ratings of their behaviour, all of the non-A-D/HD participants were correctly assigned to

their group, while there were some members of each of the three A-D/HD groups who could have been assigned to diagnostic categories other than the one to which they actually were assigned by the researcher on the basis of the parent and teacher ratings of behaviour.

## ***Discriminant Analysis of Teacher Ratings of Behaviour***

The second *Discriminant Analysis* similarly examines the membership of the four groups (*Predominantly Inattentive Type, Predominantly Hyperactive Type, Mixed Type* and clinical comparison group), this time based on the behaviour rating instruments (TRF-CBCL and ADDES (School)) completed by the boys' teachers. The *Classification Results* of this *Discriminant Analysis* are shown in table 9.4 below.

Classification results -

Actual Group	No. of Cases	Predicted Group Membership			
		0	1	2	3
Group 0 (Inattentive)	10	0 .0%	10 100.0%	0 .0%	0 .0%
Group 1 (Hyperactive)	61	0 .0%	61 100.0%	0 .0%	0 .0%
Group 2 (Mixed)	6	0 .0%	6 100.0%	0 .0%	0 .0%
Group 3 (Non-A-D/HD)	23	0 .0%	0 .0%	0 .0%	23 100.0%

Percent of "grouped" cases correctly classified: 84.00%

Table 9.4 Results of the *Discriminant Analysis* on teacher ratings of behaviour.

Once again, the *Discriminant Analysis* results show that, on the basis of the teacher ratings of their behaviour, all of the non-A-D/HD participants were correctly assigned to their group, as were the *Mixed Type* participants. However, in contrast to the parent ratings of behaviour, the teacher ratings did not discriminate effectively between the *Predominantly Inattentive Type* and *Predominantly Hyperactive Type* diagnostic subgroups.

### ***Discriminant Analysis of both Parent and Teacher Ratings of Behaviour***

The third *Discriminant Analysis* examines the assignment of participants to the four groups on the basis of both sets of ratings on the CBCL and the ADDES.

The *Classification Results* of this final *Discriminant Analysis* are contained in table 9.5.

**Further Investigations: Cluster Analysis and Discriminant Analysis**

Classification results -

Actual Group	No. of Cases	Predicted Group Membership			
		0	1	2	3
Group 0 (Inattentive)	10	4 40.0%	6 60.0%	0 .0%	0 .0%
Group 1 (Hyperactive)	61	1 1.6%	60 98.4%	0 .0%	0 .0%
Group 2 (Mixed)	6	1 16.7%	2 33.3%	3 50.0%	0 .0%
Group 3 (Non-A-D/HD)	23	0 .0%	0 .0%	0 .0%	23 100.0%

Percent of "grouped" cases correctly classified: 90.00%

**Table 9.5 Results of the *Discriminant Analysis* on parent and teacher ratings of behaviour.**

The results of the final *Discriminant Analysis* indicate that the teacher and parent ratings of behaviour combined are only slightly more accurate than when considered individually. In each instance ratings tended to be less accurate in assigning membership to the *Predominantly Inattentive*, group than for the other groups in the classification.

### **9.3 Conclusions**

The *Cluster Analysis* and *Discriminant Analysis* results raise a number of points which have important implications for both research and practice with children who have A-D/HD.

The *Dendrograms* of the *Cluster Analyses* demonstrate that parent and teacher ratings of behaviours symptomatic of A-D/HD on the CBCL and

the ADDES do have a high level of consistency between the two groups of raters, as the clusters form between the equivalent scales on each form before linking to others. This is particularly the case for the scales measuring inattentive behaviours, whilst the impulsive and hyperactive behaviour scales are less precise in their linkages.

When the ratings for either parents or teachers on the two instruments were analyzed, the linkages tended to form between the scales of each instrument, rather than between, for example, the *Inattention* scale of the ADDES and the *Attention Problems* scale of the CBCL.

These results mean that the two instruments yield internally consistent results that should be considered as a whole before comparisons are made between specific subscales on the two instruments.

In a research setting it would, therefore, be more appropriate to base theoretical constructs on the overall pattern of results on a specific instrument, rather than selecting single scales from a range of instruments in the expectation that they are all providing consistent and commensurable ratings of a single construct.

For the practitioner similar caution must be exercised. Significant scores on scales which purportedly measure similar behaviours may be misleading in the absence of scores on the other subscales measuring aspects of A-D/HD. The results also clearly show the need to obtain ratings from both home and school settings, as laid down in DSM-IV (APA, 1994, p. 84). Discrepancies between parent and teacher ratings of behaviour will have major implications in the appropriate diagnosis and treatment of A-D/HD.

The results of the *Discriminant Analyses* provide interesting information regarding the diagnostic importance of parent and teacher ratings of child behaviour.

Teacher and parent ratings of A-D/HD - symptomatic behaviours clearly discriminate between individuals who can be diagnosed with A-D/HD and those who cannot, but who do have other, general, behaviour problems.

The overall accuracy of the classifications based on parent and/or teacher ratings of behaviour were 84% accuracy (teachers), 88% accuracy (parents), and 90% accuracy (parents and teachers combined).

Both groups had similar levels of inaccuracy when cases were classified into the three diagnostic subtypes (*Predominantly Inattentive Type*, *Predominantly Hyperactive Type*, or *Combined Type*).

The reason for this may be that the instruments themselves do not allow for clear distinction between the subtypes, rather than an inability on the part of the raters to distinguish between them. The significance of this is lessened when one considers that the discrimination between A-D/HD diagnostic subtypes does not in itself lead to differences in the treatment strategies for each subtype.

In summary, both parents and teachers are able, through their ratings of observed behaviours, to consistently identify behaviours symptomatic of A-D/HD. They are also able to discriminate between these behaviours and others which are also present in children when rating them and they provide comparable pictures of behaviour in their reports.

# Chapter 10

## **Conclusions & Recommendations**

This research represents a clinical investigation into the perceived Locus of Control of boys diagnosed with A-D/HD and their non-A-D/HD, but still behaviourally disordered, peers. Within the limitations of the clinical context it has been possible to demonstrate that the perceived Locus of Control of A-D/HD boys tends to be more external than that of their peers in the clinical comparison group, and, that it is possible to change perceived Locus of Control in the direction of increased internality through participation in the *Stop, Think, Do* program. It has not been possible to arrive at outcomes that can be more generally applied to wider populations, and these have been flagged for future research.

The significant findings of the thesis are:

- 1 *Boys who have been diagnosed with A-D/HD appear to be significantly more externalising than their non-A-D/HD peers.*
- 2 *Increases in attentional deficits appear to be significantly associated with increasing externality of perceived Locus of Control.*



- 3 *Participation in the Stop, Think, Do cognitive - behavioural intervention over a 4 week interval is associated with a reduction in the level of externality of perceived Locus of Control for A-D/HD boys, as well as for their non-A-D/HD peers. The reduction in externality of perceived Locus of Control is relatively greater for those boys diagnosed with A-D/HD than for those boys in the clinical comparison group.*
  
4. *The study also found that there tended to be a relatively high degree of consistency between parent and teacher ratings of behaviour. Parent ratings of inattention were found to be particularly salient as an indicator of externality of perceived Locus of Control.*

This chapter describes the issues arising from the present research and recommendations for future study.

## **10.1 Long-Term Maintenance of Gains**

Chapter 2 of this thesis examined the rôle of perceived Locus of Control in children's educational and social development. The desirability of a relatively internal perceived Locus of Control and thus a belief in their control over outcomes and reinforcement is a thread which has run through the literature on Locus of Control for over four decades. Boor (1976), for example, found that, on a national level, high levels of externality of perceived Locus of Control in adults was reflected in suicide rates. In areas more closely related to the present research, Coleman et.al. (1966) (Cited in Nowicki & Strickland, 1973), in a survey of nearly half a million primary and secondary school students, found that internality of perceived Locus of Control was strongly related to positive scholastic achievement and indeed was the single most salient

factor in their study. The perception of one's control over events can be a critical factor in attempting to overcome negative life events both in normal situations, as related by Boone, Brabander, Gerits & Willeme (1990, p 1107) and highly abnormal ones (Bettelheim, 1960; DesPres, 1976). The positive outcomes of developing internal perceptions of causality for prosocial behaviours, include the reduction of substance abuse (Bugental, Whalen & Henker, 1977), and the self management of behaviour in social settings (Workman, 1982).

Several studies have noted that perceptions of control appear to be very important predictors of the outcomes of therapeutic behavioural and academic interventions for individuals diagnosed with A-D/HD and that improvement in perceptions of internal control could potentiate improvements in these outcomes (Bugental, Whalen and Henker, 1977; Bugental, Collins, Collins and Chaney, 1978; Hinshaw, Henker and Whalen, 1984; Schweitzer and Sulzer-Azaroff, 1995).

The evidence suggesting that *Stop, Think, Do* may be instrumental in reducing the level of externality of perceived Locus of Control needs further research to confirm its effectiveness with a larger and more representative sample of participants. The impact of this reduction on A-D/HD symptomatic behaviours is also a significant issue requiring further investigation.

Within the limitations of the present research it was not possible to conduct follow-up assessments of participants other than immediately after the intervention. The A-D/HD participants were available to the Researcher for only a limited time whilst attending the Chidley Education Centre, before returning to their homes in towns across rural and remote areas of Western Australia.

In order to investigate the impact on A-D/HD symptomatic behaviours over the long-term, a research program which focussed on the

recommended benefits and effects of cognitive - behavioural interventions, such as *Stop, Think, Do*, is necessary. Such a program should, therefore, be seen as a necessary step in further investigating change in perceived Locus of Control in individuals with A-D/HD.

The use of a two stage cognitive behavioural program which initially focusses on developing an internal Locus of Control and then establishes effective methods of cognitive reframing is also recommended as the optimal behavioural intervention for assisting boys with A-D/HD.

The second major issue that must be addressed is that of the rôles of parents and teachers in the assessment and treatment of the behavioural and attributional aspects of A-D/HD.

## **10.2 Parents and Teachers**

The study has demonstrated that parents and teachers both contribute valuable information concerning individuals with A-D/HD ways through their ratings of behaviour.

Until recently (DuPaul et.al., 1997; DuPaul et.al., 1998) the literature presented the view that, as a general rule, teachers tend to focus on disruptive behaviours, whilst parents tend to focus on inattention. The discrepancies in the views of parents and teachers in describing these behaviours is one which has received considerable attention in the literature, particularly with regard to the appropriateness of the diagnostic methods and criteria for A-D/HD which were applied by practitioners (Barkley, 1995; Edwards & Barkley, 1997; NHMRC, 1997), as discussed previously in chapter two of this thesis. The increasing use over the past two decades of standardised instruments, rather than clinical interviews and anecdotal records, to assess the frequency and

severity of A-D/HD symptomatic behaviours has led to greater accuracy in diagnosis and the discovery that, when given a consistent frame of reference, parents and teachers are very consistent in their ratings of these behaviours.

The results of the present research indicated that teacher and parent ratings of children's behaviour provide information that is highly consistent between the two groups and presents a coherent picture of those behaviours symptomatic of A-D/HD. The degree of agreement between parent and teacher ratings of behaviours of the A-D/HD boys who participated in this study is much higher than has been found previously.

Interpretation of the regression analyses presented in chapter six of this thesis suggests that the differences reported by other researchers between the parent and teacher ratings of behaviours may be due to differential focus of the two groups. Teachers appear to be more aware of those behaviours which impact on the dynamics of the classroom or playground, such as aggressive behaviours, than are parents, who may deal with the child in situations where such behaviours are less likely to be manifested, or are less likely to escalate into class-wide disputes and disruption. Teachers are often more aware of the quality and nature of peer interactions with a wider variety of children than are the parents of specific individuals (Marks, Himelstein, Newcorn & Halperin, 1999).

That these behaviours differ in how they are presented may reflect the environment, rather than intrinsic characteristics of the child. The similarities in the behavioural ratings of the participants in the present research tend to indicate that when the description of the behaviour is prescribed by a standardised checklist there is a high degree of consistency between parents and teachers.

### **10.3 The Influence of Stimulant Medication**

Another aspect of the study which requires some further investigation is the rôle of stimulant medication in the promotion of an internal perceived Locus of Control in individuals with A-D/HD.

Both Linn and Hodge (1982) and Lufi and Parish - Plass (1995) speculated that the use of stimulant medication in the treatment régime for A-D/HD might increase the tendency of individuals with A-D/HD to ascribe causation to external factors in that they see themselves as needing an external agency (the medication) in order to cope effectively in school, at work, or at home.

However, there is some substantial evidence from clinical practice that the opposite is more often the case, that individuals with A-D/HD view the medication as something which aids them in establishing and maintaining control (Garber, Garber, & Spizman, 1997).

This is a significant area which requires further research to establish clearly the effect of the use of stimulant medication on the perceived Locus of Control of individuals with A-D/HD. However, in theoretical terms, it is speculated that medication increases the inhibition of behaviour, but self-regulation is not learned, nor, more importantly is it exercised.

The development of self-regulation must be achieved by means of cognitive - behavioural interventions which train the individual to recognise:

- Those situations where self-regulation is required, and
- The most effective way of exercising it.

The degree of internality of perceived Locus of Control could well be enhanced if the taking of medication is cast in the light of assisting with choice and control, rather than serving as a further example of the way in which external agencies control the individual. The implications for best practice and the *most effective* treatment of A-D/HD are, therefore, not one psychosocial intervention, but two – stimulant medication, partnered initially by a cognitive-behavioural intervention to internalize perceived Locus of Control and followed by cognitive reframing to sustain the perceptions and behaviours that are more adaptive.

Such interventions would offer immediate impact and the increased likelihood of long-term maintenance of improvements in self-regulation. The need for effective working relationships to be established between parents, teachers, psychologists and physicians so that this occurs cannot be overemphasised. The recommendation for a two-stage approach underlines the need for a multi-modal treatment for A-D/HD. The individual with poor self-regulation clearly needs to develop conscious strategies which overcome low levels of competency in the four executive functions (*Nonverbal Working Memory, Self-Regulation of Affect, Motivation and Level of Arousal, Internalisation of Self-directed Speech, and, Reconstitution*) that are prominent in the Behavioural Disinhibition model of A-D/HD. Due to their lack of awareness and experience in using the skills necessary to cope with complex situations the training will need to contain elements that enhance their processing of information and skills in generalising what they have learnt to new and rapidly changing situations. In order to do this effectively they also need to have their behavioural inhibition and mental processing improved by the stimulant medication.

## **10.4 Other Considerations relating to Locus of Control**

A further issue may also be the rôle of cultural values and family systems in forming the individual's perception of control and their beliefs about causal relationships that affect them.

A number of the investigations into perceived Locus of Control have examined differences in perceived Locus of Control between various ethnic and cultural groups, particularly urban Caucasian and African-American populations, and more importantly for this study, differences between American and Australian populations. In the former case there were considerable differences found between African-American and Caucasian populations, with the African-American participants being significantly more external in their perceived Locus of Control (Bandura, 1995; Battle & Rotter, 1963; Crandall, Crandall & Katkovsky, 1965; Graham, 1997; Minton, 1972; Nowicki & Strickland, 1973; Phares, 1957; 1973; 1976; 1978; Rotter, 1966; 1982).

In those studies which compared general (or ethnically unspecified) samples from the Australian population with similar groups of American subjects few differences in perceived Locus of Control were found (O'Brien & Kabanoff, 1981; Ralph et al., 1995; Watkins, 1980). The similarity between American and Australian populations was also observed in the preliminary investigations for the studies contained in this thesis, as discussed in chapter four. A group of 300 classmates of the A-D/HD participants were administered the CNS-IE. For the age groups concerned there were no significant differences between the Australian group and the published (American) norms (see table 5.1 and figure 5.1 in chapter five).

Family systems and structures have also been shown to have a major

impact upon the development of children's perceived Locus of Control. A major review by Schneewind (1995) examines the rôle of families in the development of beliefs about the self, about control, and about behaviour. Some of the family variables which Schneewind identifies are:

- Sibling position - single and first-born children tend to display more internal beliefs.
- Family completeness - studies are cited which found that paternal absence tends to result in higher externality.
- Family Size - as well as birth order, the size of a family has been shown to increase externality in some studies.

Schneewind also cites findings that parents' beliefs about Locus of Control has an important effect on their children's beliefs, as does the effectiveness of their parenting skills (Schneewind, 1995, p. 122).

Other significant factors which promote the internalization of perceived Locus of Control which are discussed by Schneewind include a stimulating family environment and parenting that is consistently and contingently responsive to behaviour (p. 122).

In the context of this thesis the latter point is a most important one as it underlies the perceptions of reinforcement being contingent on behaviour. This is the major issue that was raised in chapter two of this thesis: *Does the perception of contingent reinforcement affect the level of externality of perceived Locus of Control?* Schneewind's conclusion, from his survey of the literature, is that it is indeed an important factor in the development of children's perceived Locus of Control. The view that greater insights into reinforcement are associated with internal perceived Locus of Control. A major aspect of *Stop, Think, Do* focusses on making explicit the links between behaviour and consequences through rôle



playing and discussions on what happens as a result of their behaviour (reinforcement contingencies) and how they can influence these through exercising control over their behaviour (see Appendix E). The intention of this thesis has been to show that this is particularly the case for boys with A-D/HD. Within the limitations of the research design and the participants involved, the results of the present research tend to support this position.

## **10.5                    Implications for Attention-Deficit/ Hyperactivity Disorder Symptomatology**

The research findings may also have implications for our understanding of the symptomatology of A-D/HD. The results of the Multiple Regression, Cluster Analysis, and Correlation analyses indicate that parent and teacher ratings of inattention are very consistent and are an effective indicator of the degree of externality of perceived Locus of Control, at least for the participants in this research.

At present attentional problems are not seen as being crucial in the Behavioural Disinhibition model of A-D/HD (Edwards & Barkley, 1997, p. 3). The attentional problems are seen as being a second-order effect, or an epiphenomenon. However, the *clinical* significance of inattentive behaviours can hardly be underestimated. The results of these studies demonstrate that inattention is a highly salient quality of children from both parent and teacher perspectives.

Complaints of inattention must therefore be taken seriously as they reflect the phenomena which are seen as being critical by raters, particularly as regards to following instructions and completing work. As

such, addressing inattentive behaviours is still necessary as a part of an effective intervention for students with A-D/HD.

Further, the measures of inattention appeared to be the best predictors of external perceived Locus of Control, as discussed in Chapters Six and Nine of this thesis.

The present research suggests a strong relationship between measures of attentional problems observed by parents and teachers. This lends some support to the position that attentional problems are a major aspect of the behaviours observed in those diagnosed with A-D/HD, and that the emphasis placed on them in the DSM-IV diagnostic criteria (APA, 1994) is not misplaced (Carlson, Jacobovitz & Sroufe, 1995; DuPaul, 1992; Gaub & Carlson, 1997; Henker & Whalen, 1981; White & Sprague, 1992).

## **10.6 Educational Issues**

Under ideal circumstances what would we like to see achieved in the education of boys with A-D/HD?

It would be of great benefit to researchers and practitioners if clear causal connections between the individual's perceived Locus of Control and the effectiveness of reinforcement could be demonstrated in the minds of the boys who clearly lack this essential connection. This would enable practitioners to work in cooperation with the boys to gain a greater sense of control over their environment.

Some major decisions with long term implications are required to improve the education of boys with A-D/HD. The educational needs of students with A-D/HD must be considered on a number of levels. The provision of appropriate, specific services at all levels of education; the

system and district levels, at the school, individual classroom level, and at home would probably be the single most important and effective step that could be taken.

The needs of children with A-D/HD should be recognised in policies, in the provision of appropriate resources, both to the individuals and to other members of the school communities, in the encouragement of best practice through prescribed interventions, and in the provision of accurate and usable information to the education sector at all levels.

An important step forward would be recognition of the specific needs of students who have A-D/HD in *Student Outcome Statements* and curriculum materials. The needs of individuals with A-D/HD at school have been clearly identified and articulated on a number of occasions (Barkley, 1990; 1995; Bailey & Curtis, 1997; EDWA, 1998; Mattison, Humphrey, Kales & Wallace, 1986; Prior & Griffin, 1986). Best practice in education documents have been produced in the United States by C.H.A.D.D. (Fowler, Barkley, Reeve & Zentall, 1992), as well as in Western Australia (EDWA, 1997; 1998), a project in which the Researcher was an active participant.

The readiness of educational authorities, at all levels, to devote resources to the educational needs of students with A-D/HD is a major limiting factor for many students. The persistent inattentive symptomatology that characterises children with A-D/HD often goes unrecognised and leads to them being dismissed as merely inattentive nuisances.

Teacher training in appropriate and effective intervention strategies and the provision of resources to student support services being provided to schools are essential to implement effective, targeted, strategies.

The provision of such services by education authorities to schools and teachers is particularly important for those A-D/HD students with few

educational assets, such as family support, positive attitudes towards education and access to appropriate academic interventions that can maintain their personal motivation and exploit their cognitive strengths and talents.

The long term cost of not providing these resources can be very great both for individuals and for society. Many A-D/HD individuals who have not been diagnosed, or for whom appropriate intervention has not been provided, will experience long-term unemployment, become substance abusers, and have difficulties in forming appropriate and long-lasting relationships (Weiss & Hechtman, 1986). In the context of this study of externalised Locus of Control, the connection is hypothesized between insensitivity to reinforcement contingencies, persistent external attributions and the later development of maladaptive behaviour.

Western Australian research indicates that for individuals whose A-D/HD is undiagnosed, or is diagnosed but goes untreated, there is a greatly increased probability of involvement in anti-social behaviour, substance abuse, social alienation, and criminal activity (Zubrick et al., 1996; 1997). These events have a profound impact upon the individual, and they also impact upon society as a whole - as parents, victims of crime, teachers, government and non-government agencies. The costs of the outcomes of untreated A-D/HD are, literally, incalculable (Weiss & Hechtman, 1986).

In the Western Australian educational environment there are a number of trends now evident that may impact on the education of students with A-D/HD. The trend to reducing the organisational and administrative barriers to crossing boundaries for school enrolment (that is, the ability of parents to enrol their children in government schools other than the one in whose catchment area they reside) means that some schools could be left with populations in which children who are at risk educationally, such as those with A-D/HD, are over-represented. As a consequence of

this, the so-called fractional distillation of school populations caused by parents' withdrawal of more capable and non-A-D/HD children to "better schools", the labelling of schools, and stereotypical beliefs about boys with A-D/HD, it may become increasingly difficult to provide educational opportunities of the highest calibre for boys with A-D/HD.

Given that the funding of schools continues to be based on the number of students, such a trend would lead to fewer resources being available to students who clearly need more resources than the average student in order to achieve at a comparable level. Conversely, one could in the future see that those schools which provide appropriate and effective programs will attract students whose parents believe that their programs would benefit their A-D/HD children.

A closely related issue is the trend towards ranking schools on the basis of the performance of their students on standardized tests, resulting in what the popular press, particularly in Britain have termed "league tables" of schools (Gannicott, 1998). This can also lead to potentially adverse outcomes for students at schools which are perceived to be less academically-successful. These include the migration of talented or more able students to schools which are perceived to have better educational programs, and the increase in negative attitudes towards education, society, and themselves among students, including those with A-D/HD, who are left in schools which languish at the bottom of the table, in danger of relegation to non-league status.

The trend towards privatisation of education, or the ability of schools to choose students could, quite conceivably, lead to the exclusion of A-D/HD students from some schools.

All of these trends focus on the ability of parents and schools to make free choices, but which are seen by their critics as likely to entrench educational disadvantage for students with learning, behavioural and

social difficulties.

In Australia, the trend at both the state and federal levels of government, is to make increasing use of standardized literacy and numeracy testing for the purpose of making judgements about effectiveness and funding. This policy may also adversely affect students with A-D/HD, as well as potentially contributing to increase the externality of their perceived Locus of Control. The results of such testing are usually only made available in consolidated form, with the result that students who are accustomed to performing poorly will assume that they have once again failed, or even that they have let their classmates down.

## **10.7 Taking Control**

What is the meaning of *taking control* for boys?

For many boys who have only limited self-awareness of their behaviour and self-control, the prospect of taking (self-) control may not only be frightening, but also be resented as imposing on their freedom to behave spontaneously, without constraint. The effectiveness of cognitive - behavioural interventions may, therefore, be limited by the opposition of participants to becoming still, quiet and docile (Winett & Winckler, 1972). Seeing this as being imposed on them by adults could indeed result in a more external perceived Locus of Control than in reducing the level of externality.

This probably reflects the boundless human ability to rationalize their way out of changing behaviour that *they* are comfortable with, but *those around them* are not.

This could be addressed by providing appropriate models of “boys who are

in control” to participants. There is certainly the opportunity to develop video or multimedia packages to accomplish this, as well as mentoring programs that would enable individuals who have successfully attained control over their own lives to assist others by passing on their experiences and skills. In these ways, the desirability of *taking control* could be established in a meaningful context among boys whose previous experience has failed to establish this behavioural asset.

In chapter eight of this thesis the potential for undermining of the perception of control was discussed. The undermining of perceptions of internal control can be seen in the way which parents frequently articulate, express and verbalize explicitly their frustration to the child regarding their behaviour and taking responsibility for it. When this occurs it almost inevitably contributes to the child’s perception of a lack of control over their behaviour and of the causal connection between their behaviour and its consequences.

Similarly, in the classroom teachers may undermine the development of internality through their control and manipulation of reinforcers in that setting. The effects of this can be countered by the use of behaviour management structures which emphasize choice and responsibility, making these elements clear to their students

Most behaviour management strategies such as *Assertive Discipline* (Canter & Canter, 1992; Rogers, 1995; 1998), as well as cognitive - behavioural interventions emphasize the student’s ability and *need* to make appropriate behavioural choices (Braswell & Bloomquist, 1991; Lefcourt, 1982; Petersen & Gannoni, 1992; 1994; Workman, 1982). It is implicit in this approach that an internal (or relatively internal) perceived Locus of Control is both desirable and necessary. Consistent emphasis on the choice and responsibility aspects should therefore buttress the development of an internalized Locus of Control, rather than reinforce the perception of external control.

## **10.8 Reflections on the Research**

The initial impetus for the research in this thesis came from an interest in improving the way in which appropriate interventions for A-D/HD children can be selected. Out of this grew a desire to examine the effectiveness of cognitive - behavioural intervention programs in developing a more internal perceived Locus of Control in participants.

Over the period of work on this thesis the emphasis and outcomes have been modified and developed to elaborate on the original proposal. From examining a variable by which teachers and school psychologists could decide whether cognitive - behavioural intervention would be the most appropriate treatment strategy for a specific individual, the focus has widened to include an investigation into the effectiveness of a particular cognitive - behavioural intervention (*Stop, Think, Do*) in changing the perceived Locus of Control of A-D/HD participants. A second issue which developed through the research was the consistency in the ratings of behaviours between parents and teachers of boys with A-D/HD.

The research outcomes have tended to show perceived Locus of Control to be a variable that should be addressed in the case management of A-D/HD individuals. There are valid and reliable measures of Locus of Control and appropriate, widely-available, interventions which appear to be effective in developing greater internality of perceived Locus of Control.

The importance of these initial results can be seen when one considers that a relatively internal perceived Locus of Control is desirable for children with A-D/HD. Many studies have focussed on the rôle of internal Locus of Control in academic, behavioural, interpersonal, and career areas. Individuals with relatively internal Locus of Control have been shown to be more likely to develop academic problem solving skills, social-emotional problem solving skills, behavioural self-management,



and be more effective in overcoming depression and in seeking out more challenging occupations than those with strongly external perceived Locus of Control (Bandura, 1977; Battle & Rotter, 1963; Boor, 1976; Herbert, 1991; Mac Gregor, 1999; Phares, 1973; Post, 1999; Sandstrom, 1999; Tiggeman & Crowley, 1993; Tiggemann, Winefield, Winefield & Goldney, 1991; Trice & Gilbert, 1990; Trusty, 2000; Weiner, 1986; Workman, 1982).

The research demonstrated that participation in the *Stop, Think, Do* program was associated with a change in the direction of increased internality for both the A-D/HD and clinical comparison group participants. This change was relatively greater for the A-D/HD participants than it was for the clinical comparison group.

Further research is required, however, to establish the impact of the change in perceived Locus of Control on A-D/HD symptomatic behaviours, particularly in the long term. Such research should also adopt a more rigorous research model so that the outcomes can more readily be generalised to the wider population of the three diagnostic subtypes of A-D/HD.

The research also suggests that teachers and parents are able to contribute consistent ratings of A-D/HD symptomatic behaviour that are important in the diagnosis of A-D/HD and the targeting of such behaviours for subsequent interventions.

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# **Appendix A**

## **Letter to Parents of Participants**

Mark Bivens B. App Sc, Grad Dip Psych, Dip Ed,  
Member Australian Psychological Society, Registered Psychologist

3 Pinner Place  
LYNWOOD WA 6147

<Date>

«Name1»

«Street»

«Town»

Dear «Name2»

I am writing to ask your permission to involve your «pronoun» «child» in the research which I am conducting as part of my studies at Murdoch

University. This research is separate from my work as the School Psychologist at the school your child attends, but it has the approval of the Department of Education and the Principal of your child's school.

The research is intended to investigate the degree of responsibility that children with attentional problems believe they have for their behaviour and the things which happen in their lives, for example; what reasons children give for being successful on exams, and whether factors such as chance, luck, or other outside forces have more effect on their lives and things that happen than does their behaviour and beliefs.

The involvement consists of a questionnaire which «child2» fills out regarding their beliefs, and a series of questionnaires which the teachers and yourselves will be requested to complete and return.

The questionnaires are also used by the Education Department's School Psychology Service in assessing children with attentional and/or behavioural difficulties.

Although I would like you to fill out the personal particulars on the forms, please be assured that these will not be transferred to the research data.

After the completion of the research the forms and questionnaires will be kept in locked storage for five years, as required by University regulations. At the end of this period they will be destroyed. The information gathered will not be made available to any other person or organisation for any purpose whatsoever, except where it forms a part of your child's school psychology file, a document which is mandated by Education Department regulations.

The questionnaires contain questions which will give an indication of the attentional difficulties «child2» may have.

I am hoping to show that the level of belief in external causes for events is related to the level of attentional problems.

Later I will readminister the questionnaire to the children to see whether the programme has helped them to take more responsibility for their own behaviour.

Please complete the bottom part of the enclosed consent form and return it to me in the stamped, addressed envelope provided. If you choose to allow «child2» to take part in the research I will send you the appropriate questionnaires after I have received the consent form from you .

If you have any questions, or would like to discuss this further, please feel free to contact me after 6 pm on 09 458 4053.

Thank you.

Yours faithfully,

Mark Bivens.



# Appendix B

## Instructions to Parents of Participants

### Instructions for Completing the Questionnaires

Thank you for agreeing to allow your child to participate in this study. As you know, the purpose of the study is to examine beliefs about the causes of their behaviour, and things which happen to themselves and to other people, held by children who have been diagnosed as attentionally disordered.

The two questionnaires which have been enclosed provide information on the level of attention problems which your child is experiencing. It is important to rate each of the behaviours on the basis of your child's behaviour prior to their commencing on medication, as the medication does have a major effect on the frequency of behaviours typical of ADD.

### Child Behaviour Checklist. (CBCL)

This questionnaire asks you to rate your child's behaviour on a number of different areas, many of the questions relate to other problems which children and teenagers (the form is used with children aged from 6 to 18)

may be experiencing.

*The presence of questions relating to drug/alcohol use or sexual problems, among others, is not meant to imply that these areas are a part of ADD behaviour, but they are indicators for other behavioural disorders which the CBCL is also used to assess*

The most important questions are those on pages 3 and 4. They are answered either with a 0 (not true, or never), a 1 (some of the time or occasionally), or a 2 (often or all of the time). Please take the time to answer each question.

Attention Deficit Disorders Evaluation Scale. (ADDES)

The focus of this questionnaire is specifically on ADD. It has three sub-scales which relate to the three elements of ADD: attention, impulsiveness, and hyperactivity. The ADDES has been found to be a useful and accurate tool for assessing the severity of ADD in individual children and adolescents, as well as being a very good before and after rating of the effectiveness of medical and behavioural programmes for ADD.

Once again, the questionnaire is completed by rating different behaviours, this time on a scale of 0 (never), to 4 (several times per hour). It is important to answer each question, even if the response is a zero.

When you have completed the questionnaires, please return them in the envelopes provided.

The scores from the forms will then be tabulated and totalled, then compared with your child's score on the *Perceived Locus of Control* questionnaire, which is the measure of how much in control of events they feel that they and other people are.

The *Perceived Locus of Control* questionnaire is given again at the end of the child's placement at Chidley. This is to establish what, if any change has been made to their beliefs by the educational programmes in use here.

If you would like to receive feedback on your child's results please indicate this on the forms as you return them, since when they are finally tabulated all identifying information is removed to protect their privacy. Due to the privacy requirements I cannot provide specific information comparing your child to other individuals.

Thank you for your interest and participation.

Please feel free to contact me if you have any queries or concerns.

Yours sincerely,

Mark Bivens.

# **Appendix C**

## **Instruments**

This appendix contains the CNS-IE questionnaire (Nowicki & Strickland, 1973) in the form that they were presented to the participants, the Child Behavior Checklist, the Teacher Report Form of the Child Behaviour Checklist and the two forms (home and school) of the Attention Deficit Disorders Evaluation Scale.

**Note: For copyright reasons the content of Appendix C (pp289-311) has not been reproduced.**

**(Co-ordinator, ADT Project (Retrospective), Curtin University of Technology, 21.11.02)**

## Appendix D

### Agglomeration Schedules for the Chapter 9 *Hierarchical Cluster Analyses*

Tables D 1 to D 5 contain the agglomeration schedules for the *Cluster Analyses* in Chapter Nine.

Agglomeration Schedule using Average Linkage (Between Groups)						
	Clusters Combined			Stage Cluster 1st Appears		
Next Stage	Cluster 1	Cluster 2	Coefficient	Cluster 1	Cluster 2	
1	2	3	108.821938	0	0	2
2	1	2	122.047104	0	1	5
3	6	7	131.538727	0	0	4
4	5	6	139.812469	0	3	6
5	1	4	161.239914	2	0	6
6	1	5	165.148163	5	4	0

Table D 1 *Hierarchical Cluster Analysis* Agglomeration Schedule for ADDES (Home) and CBCL scores.

Agglomeration Schedule using Average Linkage (Between Groups)

Next Stage Stage	Clusters Combined		Coefficient	Stage Cluster 1st Appears	
	Cluster 1	Cluster 2		Cluster 1	Cluster 2
1	3	4	86.517456	0	0
2	2	3	114.008636	0	1
5	1	5	137.570328	0	0
3	6	7	143.10095	0	0
5	1	2	144.807236	3	2
6	1	6	163.578522	5	4
0					

Table D 2 Hierarchical Cluster Analysis Agglomeration Schedule for ADDES (School) and TRF-CBCL scores.

Agglomeration Schedule using Average Linkage (Between Groups)

Next Stage Stage	Clusters Combined		Coefficient	Stage Cluster 1st Appears		
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	4	101.399033	0	0	4
2	2	3	108.821938	0	0	3
3	2	6	123.543007	2	0	5
4	1	5	127.259338	1	0	5
5	1	2	141.822693	4	3	0

Table D 3 Hierarchical Cluster Analysis Agglomeration Schedule for ADDES (Home) and ADDES (School) scores.

Agglomeration Schedule using Average Linkage (Between Groups)

Next Stage Stage	Clusters Combined		Coefficient	Stage Cluster 1st Appears	
	Cluster 1	Cluster 2		Cluster 1	Cluster 2
1	1	5	33.361214	0	0
7					
2	3	8	85.264153	0	0
3					
3	3	4	95.543823	2	0
5					
4	2	6	115.011871	0	0
5					

5	2	3	123.739983	4	3
6					
6	2	7	134.626816	5	0
7					
7	1	2	145.933853	1	6
0					

Table D 4 *Hierarchical Cluster Analysis Agglomeration Schedule for CBCL and TRF-CBCL scores.*

Next Stage	Agglomeration Schedule using Average Linkage (Between Groups)		Coefficient	Stage Cluster 1st Appears	
	Cluster 1	Cluster 2		Cluster 1	Cluster 2
1	1	5	33.361214	0	0
12					
2	3	8	85.264153	0	0
3					
3	3	4	95.543823	2	0
8					
4	9	12	101.399033	0	0
9					
5	10	11	108.821938	0	0
7					
6	2	6	115.011871	0	0
8					
7	10	14	123.543007	5	0
11					
8	2	3	123.739983	6	3
10					
9	9	13	127.259338	4	0
11					
10	2	7	134.626816	8	0
12					
11	9	10	141.822693	9	7
13					
12	1	2	145.933853	1	10
13					
13	1	9	160.172516	12	11
0					

Table D 5 *Hierarchical Cluster Analysis Agglomeration Schedule for CBCL, TRF-CBCL, ADDES (Home) and ADDES (School) scores.*



# Appendix E

## **Outline of the *Stop, Think, Do* cognitive - behavioural intervention.**

This appendix contains chapter one of the manual for *Stop, Thank, Do*.

**Note: For copyright reasons the content of Appendix E (pp316-323) has not been reproduced.**

**(Co-ordinator, ADT Project (Retrospective), Curtin University of Technology,  
21.11.02)**